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30 September 2010

Mr. Gary Miller  
Task Order Monitor  
U.S. Environmental Protection Agency (EPA)  
1445 Ross Avenue, Suite 1200  
Dallas, TX 75202-2733

**Subject: Field Oversight Activities Report (13 – 31 August 2010)**  
**Gulco Marine Maintenance Site RI/FS Oversight**  
**U.S. Environmental Protection Agency Region 6**  
**Remedial Action Contract 2**  
**Contract: EP-W-06-004**  
**Task Order: 0006-RICO-06JZ**

Dear Mr. Miller:

EA Engineering, Science, and Technology, Inc. (EA) is submitting this Field Oversight Activities Report that summarizes the remedial investigation/feasibility study (RI/FS) oversight and split sampling activities conducted on 13 – 31 August 2010 at the Gulco Marine Maintenance site in Freeport, Brazoria County, Texas.

If you have any questions regarding this submittal, please call me at (972) 315-3922.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Mark Paddack', is written over a light blue horizontal line.

Mark Paddack  
Project Manager

Enclosure

cc: Michael Pheeny, EPA Contracting Officer (letter only)  
Rena McClurg, EPA Project Officer (letter only)  
Fritz Meyer, EA Program Manager (letter only via e-mail)  
Jeff Hills, EA Financial Manager (letter only via e-mail)  
File





## **Field Oversight Activities Report (13 – 31 August 2010)**

**Gulfco Marine Maintenance Site  
Freeport, Brazoria County, Texas  
EPA Identification No. TXD055144539**

**Remedial Action Contract 2 Full Service  
Contract: EP-W-06-004  
Task Order: 0006-RICO-06JZ**

*Prepared for*

U.S. Environmental Protection Agency  
Region 6  
1445 Ross Avenue  
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*Prepared by*

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September 2010  
EA Project No. 14342.06

## **1.0 INTRODUCTION**

This Field Oversight Activities Report summarizes remedial investigation/feasibility study (RI/FS) oversight activities conducted from 13 – 31 August 2010 at the Gulfco Marine Maintenance (Gulfco) Superfund site, located in Freeport, Brazoria County, Texas. As requested by the U.S. Environmental Protection Agency (EPA), EA Engineering, Science, and Technology, Inc. (EA) performed oversight of sediment, pore water, and surface water sampling activities conducted by Benchmark Ecological Services, Inc. (Benchmark), a subcontractor to URS Corporation (URS) for this portion of the project, which in turn is working under the direction of the potentially responsible party (PRP)'s primary consultant, Pastor, Behling & Wheeler, LLC (PBW). Additionally, EA obtained six split samples of sediment, as directed by Mr. Gary Miller, EPA Task Order Monitor.

During field oversight activities, EA is required to evaluate and document PRP performance of field work and confirm PRP adherence with applicable standard operating procedures (SOPs) and the following EPA-approved documents:

- URS's Final Baseline Ecological Risk Assessment Work Plan and Sampling and Analysis Plan (URS 2010)
- PBW's Memorandum: "Advance Notice of Baseline Ecological Risk Assessment Field Activities, Gulfco Marine Maintenance Site, Freeport, Texas." (PBW 2010).

Section 2 summarizes oversight and split sampling activities associated with the 24 June 2010 wetlands sediment sampling event. Appendix A contains a photographic record of field activities performed, and Appendix B contains a copy of field notes recorded during field oversight activities.

## **2.0 FIELD ACTIVITIES**

Field activities conducted by Benchmark included the collection of wetlands sediment samples, Intracostal Waterway Channel (ICWWC) sediment samples, wetlands surface water samples, and collection and processing of wetland and ICWWC pore water sediment samples. Where applicable, field parameters of sediment and water were also collected by Benchmark. The samples collected by Benchmark during this field effort were submitted for applicable site-specific contaminant of concern analyses, as well as for toxicity testing.

Benchmark also conducted daily health and safety meetings. The Benchmark crews working at the site conducted the work in a safe manner, and in most cases, the work performed in a manner consistent with SOPs and plans developed for the project. The following subsection discusses these activities in greater detail on a day by day basis.

### **2.1 Summary of Daily Oversight for Sampling Activities**

The following subsections describe oversight of field activities performed on a daily basis.



**13 August 2010**

On 13 August 2010, EA mobilized to the field and initiated oversight of wetland sediment sampling activities performed by Benchmark, and also collected five split samples from wetland sediment sample locations as directed by EPA. EA arrived on site at 9:15. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Ryan Zak, Benchmark
- Mr. Brett Sutton, Benchmark
- Mr. Duane Thomas, EA, Environmental Scientist
- Mr. Mike Chanov, EA, Environmental Scientist (arrived at site at 11:10)
- David Lingle, URS (arrived on site at 12:13)
- Margaret Roy, URS (arrived on site at 12:13)

The Benchmark field crew had mobilized to the site on 12 August 2010, and had initiated field work which included collection of wetland sediment samples from several sample locations, including EWSED02, EWSED05, and EWSED06. Split samples of the wetland sediment collected from these locations had originally been planned. However, due to Benchmark sampling these locations prior to EA's arrival, two of the split sample locations were replaced with sample locations EWSED03 and EWSED04, while EWSED02 was removed from the planned split wetland sediment sample list.

Table 1 provides a summary of wetland sediment sampling activities that occurred on 13 August 2010. The wetland sediment samples were collected by Benchmark using a stainless steel trowel, and were collected from surface to a maximum depth of six inches below surface grade. The collected sediment was placed in laboratory-supplied three-gallon buckets, and then homogenized using a stainless steel mixing head powered by a drill. Once homogenized, the samples were transferred to sample jars. Photographs 1 and 2, Appendix A, illustrate sediment sampling methods utilized by Benchmark for collection of wetland sediment samples.

At most of the wetland sediment sample locations approximately one to two inches of organic sediment was encountered, followed by a layer of red clay. Photograph 3, Appendix A, is a representative view of the wetlands sediment encountered at the site. At wetland sediment sample location NAS01, metallic scale/shavings were encountered at the surface, and a decision was made by the URS personnel visiting the site to remove this material and then collect the sediment sample. Once this material was removed, Benchmark proceeded with sample collection and encountered hard-packed sediment and the presence of large metal particles, the latter of which were removed from the sample. During collection and homogenization of this sample, EA stressed the need for the sample to be adequately homogenized, so they were not collecting a sediment sample representative of only the upper portion of the sample area. Organic/root fragments, glass chips, and other debris were also removed from the material while it was being transferred to sample jars.

Benchmark ceased field sampling activities at 12:50 in order provide a tour of the site to David Lingle and Margaret Roy with URS, and to package samples for shipment. EA completed

processing and packaging of split wetland sediment samples at 1445 hours and delivered the packed sample cooler to Federal Express for overnight (for Saturday delivery) to Test America Laboratories.

**TABLE 1 SUMMARY OF WETLAND SEDIMENT SAMPLES (13 AUGUST 2010)**

Sample Location	Date	Sample Time	EA Split Sample Location
EWSED08	13 August 2010	09:35	----
EWSED03	13 August 2010	10:23	EWSED03 (PAHs and Metals)
EWSED04	13 August 2010	10:51	EWSED04 (PAHs and Metals)
EWSED07	13 August 2010	11:25	EWSED07 (PAHs and Metals)
NAS01	13 August 2010	12:32	NAS01 (Metals)
NAS01 (Dup)	13 August 2010	12:32	NAS01 Dup (Metals)

As documented in Table 1, EA collected five split samples as part of the 13 August 2010 field oversight activities. A chain of custody for these samples was completed for the samples, with the specified analytes being poly aromatic hydrocarbons by EPA Method 8270 C (samples EWSED03, EWSED04, and EWSED07). Additionally, all of the split samples were analyzed for RCRA 8 metals (plus copper, nickel, and zinc) by EPA Method 6010B/6020. The samples collected by EA were labeled, packed in an ice-chilled cooler, and the chain of custody for the samples were placed in the cooler in a Ziploc bag, prior to sealing and placing custody seals on the cooler for shipment to Test America Laboratories.

### **16 August 2010**

On 16 August 2010, EA arrived at the Site at 1436 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Mr. Brett Sutter, Benchmark
- Mr. Mike Chanov, EA, Environmental Scientist

From 1430 to 1520 hours, the Benchmark field crew decontaminated field sampling equipment and prepared field blanks in preparation for the day's sampling event. Field activities for the day consisted of Benchmark collecting wetland sediment samples. These sediment samples were collected and handled in the same manner as those wetland sediment samples collected 13 August 2010. Table 2 provides a summary of wetland sediment sampling activities that occurred on 16 August 2010.

**TABLE 2 SUMMARY OF WETLAND SEDIMENT SAMPLES (16 AUGUST 2010)**

Sample Location	Date	Sample Time	EA Split Sample Location
NAS02	16 August 2010	15:28	----
NAS03	16 August 2010	16:00	----
NAS05	16 August 2010	16:18	----
NAS04	16 August 2010	16:50	----
NAS06	16 August 2010	17:00	----

Sediment collected by Benchmark from sample collection area NAS05 was inadvertently placed in an unlabeled jar. This situation was corrected by using a correctly labeled jar for the sample, and returning the soil in the unlabeled jar back to the NAS05 sample location. At sample location NAS04, Benchmark was only able to sample to a depth of three inches due to the presence of cobbles and stones at this sample location. Field work for the day was completed at 1725 hours.

### **17 August 2010**

On 17 August 2010, EA arrived at the Site at 0800 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Mr. Brett Sutter, Benchmark
- Mr. Mike Chanov, EA, Environmental Scientist

From 0805 to 0840 hours, the Benchmark field crew decontaminated field sampling equipment and prepared field blanks in preparation for the day's sampling event. Field activities for the day consisted of Benchmark collecting wetland sediment samples. The sediment samples were collected and handled in the same manner as wetland sediment samples collected 13 and 16 August 2010. Table 3 provides a summary of wetland sediment sampling activities that occurred on 17 August 2010.

**TABLE 3 SUMMARY OF WETLAND SEDIMENT SAMPLES (17 AUGUST 2010)**

<b>Sample Location</b>	<b>Date</b>	<b>Sample Time</b>	<b>EA Split Sample Location</b>
NAS07	17 August 2010	09:00	----
NAS08	17 August 2010	09:31	----
NAS09	17 August 2010	10:02	----

Sediment collected from sample collection area NAS08 was of a consistency that it did not mix well during homogenization prior to containerization. At 1030 hours, Benchmark halted wetland sediment sampling activities in order to process and ship the collected samples. At 1530 hours, the field crew met back on site and conducted a reconnaissance for the ICWWC sample locations. No further sample collection occurred for the day; the field crew left the site at 1637 hours.

### **18 August 2010**

On 18 August 2010, EA arrived at the Site at 0850 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Mr. Brett Sutter, Benchmark
- Mr. Mike Chanov, EA, Environmental Scientist

Field activities for the day consisted of Benchmark collecting ICWWC sediment samples utilizing a sampling boat equipped with a ponar sampler. Two to eight ponar grab samples were collected from a 10 foot radius representative of each sample location marked in the channel with a rod. Water accumulated on top of each sediment sample collected with the ponar sampler was decanted using a peristaltic pump, and the sediment was transferred from the ponar sampler to a laboratory-supplied bucket, using a sampling spoon. While removing the grab samples from the ponar sampler, Benchmark exercised care not to retrieve sediment in contact with the sides of the ponar sampler. A stainless steel mixer, powered by a drill, was used to homogenize the ICWWC sediment samples. The homogenized sample was then transferred to laboratory supplied sample buckets or sample jars and were placed in an ice-chilled cooler. Sampling equipment was decontaminated using soap and de-ionized water. Excess sediment not retained for analysis was returned to each sample location. Photographs 4 through 8, Appendix A, illustrate ICWWC sediment sample collection and handling techniques utilized by Benchmark.

Table 4 summarizes sediment samples collected from the ICWWC on 18 August 2010. During sample collection at EIWSED06, sampling activities had to temporarily be halted from 1452 to 1503 hours to allow sediment disturbed by the boat to settle. Only two of the four sampling attempts at this location were successful in retrieving sediment.

**TABLE 4 SUMMARY OF INTRACOASTAL WATERWAY SEDIMENT SAMPLES  
(18 AUGUST 2010)**

Sample Location	Date	Sample Time	Number of Ponar Samples	Field Parameters	EA Split Sample Location
EIWSED03	18 August 2010	08:11 to 08:59	3 (four ponar samples collected; only three retained)	pH: 6.90 Temperature: 31.1 °C ORP: -10.8 mV	----
EIWSED02	18 August 2010	09:10-09:48	3	pH: 6.80 Temperature: 31.3 °C ORP: -4.5 mV	EIWSED02
EIWSED01	18 August 2010	10:30-11:32	8	pH: 6.70 Temperature: 31.4 °C ORP: 2.6 mV	----
EIWSED04	18 August 2010	11:56 – 12:10	2	pH: 6.86 Temperature: 31.4 °C ORP: -6.5 mV	----
EIWSED05	18 August 2010	12:23-12:45	Not Recorded	pH: 6.89 Temperature: 31.5 °C ORP: -8.5 mV	----
EIWSED06	18 August 2010	14:37-15:15	2	pH: 7.04 Temperature: 31.9 °C ORP: -19.3 mV	----
EIWSED07	18 August 2010	16:00-16:30	2	pH: 6.82 Temperature: 31.8 °C ORP: -4.3 mV	----

On 18 August 2010, Benchmark also collected water quality parameters at multiple depths for each of the ICWWC sediment sample locations. Table 5 summarizes these collected water quality parameters. Photograph 9, Appendix A, is a representative view of the field equipment

Benchmark utilized for collection of water quality parameters. Field work for the day ceased at 1700 hours. EA completed the chain of custody, and packaged and dropped off the EIWSED02 split sample cooler at Federal Express for overnight delivery of the sample to Test America. Split sediment sample EIWSED was analyzed for PAHs by EPA Method 8270C.

**TABLE 5 SUMMARY OF WATER QUALITY PARAMETERS COLLECTED FROM INTRACOASTAL WATERWAY SEDIMENT SAMPLE LOCATIONS (18 AUGUST 2010)**

Sample Location/ Time	Depth	Temperature (°C)	Conductivity (µs/cm)	Salinity (ppt)	pH	Dissolved oxygen (mg/L)	ORP (mV)
EIWSED03 09:47-09:56	1 ft 9 in	30.80	43,600	25.20	8.09	4.76	123.8
	1 ft	30.16	43,900	25.19	8.03	4.81	19.9
EIWSED02 09:59-10:08	3 ft 6 in	30.09	43,660	25.24	8.06	4.35	74.9
	1 ft	30.15	43,680	25.23	8.01	4.29	53.6
EIWSED01 11:35-11:39	6 ft 9 in	30.11	43,940	25.40	7.99	5.74	41.0
	4 ft	30.11	43,940	25.42	7.98	5.39	33.7
	1 ft	30.11	43,940	25.41	7.97	5.11	29.6
EIWSED04 12:55-13:03	1 ft 4 in	30.47	44,180	25.40	7.95	4.70	0.7
EIWSED05 12:50-12:53	2 ft 6 in	30.40	40,020	25.40	7.96	5.90	NA
	1 ft	30.62	39,960	25.35	7.97	5.15	7.9
EIWSED06 15:20-15:27	3 ft 6 in	31.59	42,950	24.00	7.97	7.23	-22.4
	1 ft	31.51	38,210	24.10	8.01	6.60	-16.3
EIWSED07 16:36-16:39	6 ft 3 in	31.62	42,840	23.95	8.07	6.95	-14.5
	3 ft	31.63	42,770	23.92	8.06	6.94	-21.8
	1 ft	31.63	42,690	23.88	8.04	6.86	-21.4

### **19 August 2010**

On 19 August 2010, no field sampling occurred. However, a site reconnaissance of the wetlands sediment sample locations was performed to evaluate whether or not these sample locations contained sufficient pore water for the planned pore water sampling event. Due to rainy conditions, the reconnaissance was postponed until 1300. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Mr. Brett Sutter, Benchmark
- Mr. Mike Chanov, EA Environmental Scientist

The reconnaissance was conducted from 1420 to 1453 hours. Table 6 provides a summary of wetland sediment sample conditions observed during the site reconnaissance.

**TABLE 6 SUMMARY OF WETLAND SEDIMENT SAMPLE LOCATIONS FOR PRESENCE OF PORE WATER PER SITE RECONNAISSANCE (19 AUGUST 2010)**

<b>Sample location</b>	<b>Condition</b>
EWSED01	Wet all the way to the surface with some overlying water
EWSED02	Wet all the way to the surface with some overlying water
EWSED03	Moist all the way from surface to below six inches beneath surface
EWSED04	Moist all the way from surface to below six inches beneath surface
EWSED05	Moist all the way from surface to below six inches beneath surface
EWSED06	Moist all the way from surface to below six inches beneath surface
EWSED07	Moist all the way from surface to below six inches beneath surface
EWSED08	Wet all the way to the surface with some overlying water
EWSED09	Moist all the way from surface to below six inches beneath surface
EWSW01	Wet all the way to the surface with some overlying water
EWSW04	Wet all the way to the surface with some overlying water

### **20 August 2010**

On 20 August 2010, EA arrived at the Site at 0730 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Mr. Brett Sutter, Benchmark
- Mr. Mike Chanov, EA Environmental Scientist

Field activities for the day consisted of Benchmark collecting sediment pore water samples from the ICWWC sediment sample locations. The sediment samples were collected using the same equipment and methodologies as those used for ICWWC sediment samples collected on 18 August 2010. Water was decanted off the top of the sediment samples using a peristaltic pump. Two five gallon buckets of sediment were collected at each sample location in order to provide a sufficient volume of material to extract and sample pore water contained in the sediment. As part of the sampling activities, Benchmark also collected water quality parameters at each of the sediment sample locations during collection of the sediment samples for pore water extraction and sampling. Table 7 summarizes the sediment samples collected from the ICWWC for pore water extraction and sampling, and Table 8 summarizes the water quality parameters collected as part of this sampling event.

**TABLE 7 SUMMARY OF INTRACOASTAL WATERWAY SEDIMENT SAMPLES COLLECTED FOR EXTRACTION AND COLLECTION OF SEDIMENT PORE WATER (20 AUGUST 2010)**

Sample Location	Date	Sample Time	Number of Ponar Samples	Field Parameters	EA Split Sample Location
EIWSED03PW	20 August 2010	10:10 to 10:40	4	pH: 7.07 Temperature: 30.3°C ORP: -21.2 mV	----
EIWSED02PW	20 August 2010	09:25-09:45	Not Recorded	pH: 7.01 Temperature: 30.2 °C ORP: -16.5 mV	----
EIWSED01PW	20 August 2010	08:20-08:50	4	pH: 7.21 Temperature: 30.2 °C ORP: -28.2 mV	----

**TABLE 8 SUMMARY OF WATER QUALITY PARAMETERS FOR INTRACOASTAL WATERWAY SEDIMENT SAMPLES COLLECTED FOR EXTRACTION AND COLLECTION OF SEDIMENT PORE WATER (20 AUGUST 2010)**

Sample Location/ Time	Depth	Temperature (°C)	Conductivity (µs/cm)	Salinity (ppt)	pH	Dissolved oxygen (mg/L)	ORP (mV)
EIWSED03PW 10:40	1 ft 5 in	29.18	43,290	27.76	7.74	5.50	6.6
EIWSED02PW 09:48	3 ft 6 in	28.89	46,720	27.92	7.76	5.24	-87.5
	1 ft	28.87	46,700	27.90	7.76	5.03	-90.0
EIWSED01PW 09:00-09:10	6 ft	28.80	46,710	27.99	7.76	4.79	-34.5
	3 ft	28.80	46,710	27.94	7.76	4.82	-49.4
	1 ft	28.81	46,680	27.94	7.76	4.62	-56.1

At 1104 hours, Benchmark arrived back at the boat dock and placed the collected sediment samples on ice. At 1113 hours, Benchmark homogenized sediment sample EIWSED01PW in a manner consistent with the ICWWC sediment samples collected and homogenized 18 August 2010 (Photograph 8, Appendix A).

Photographs 10 through 14, Appendix A, illustrate techniques utilized by Benchmark to extract and collect sediment pore water samples, and these techniques are described in the subsequent sections of this document. Following homogenization, the sediment sample was transferred from the sample bucket to 750 ml nalgene sample bottles using decontaminated stainless steel spoons. At 1130 hours, twelve of the centrifuge bottles containing the sediment were loaded into three centrifuges. The samples were spun at approximately 3,500 revolutions per minute (rpms) for 15 minutes.

From 1143 to 1158 hours, Benchmark recovered the pore water that had separated from the sediment using a syringe. The extracted pore water was then filtered to remove suspended solids. Once the pore water had been extracted from the sample bottles, the spent sediment was removed from the sample bottles using the stainless steel spoon and the centrifuge bottles were re-filled with new sediment. Benchmark did not rinse bottles between centrifuge runs involving



extraction of the same pore water sample. The process of extracting pore water from the EIWSED01PW sediment sample continued until 1320 hours, when pore water had been obtained from the first bucket containing the EIWSED01PW sediment. Excess water not needed to fill the first pore water sample container was transferred into the next round of bottles to be used for the EIWSED01PW pore water sample.

At 1300 hours Benchmark homogenized the second bucket of EIWSED01PW sediment and centrifuged this material until the required volume of water had been obtained from the sediment. The pore water obtained from the two buckets of EIWSED01PW was combined, homogenized, and placed in a 20 liter sample container.

From 1510 to 1530 hours, Benchmark decontaminated equipment. From 1531 to 1740 hours, Benchmark homogenized, centrifuged, and collected and filtered sediment pore water from the EIWSED02PW sediment sample in the same manner described for EIWSED01PW. Equipment was decontaminated at the completion of the pore water extraction/collection activities.

From 1714 to 2020 hours, Benchmark homogenized, centrifuged, collected, and filtered sediment pore water from the EIWSED03PW sediment in the same manner described for EIWSED01PW. A three liter volume of pore water was collected for analysis, as was a three liter volume to be used for a MS/MSD sample. Equipment was decontaminated at the completion of the pore water extraction/collection activities. At 2026 hours, the pore water samples were placed in bags and placed in an ice-chilled cooler. Field crews left the site for the day at 2035 hours.

## **21 August 2010**

On 21 August 2010, EA arrived at the Site at 0720 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Mr. Brett Sutter, Benchmark
- Mr. Mike Chanov, EA, Environmental Scientist

At 0830 hours, Benchmark returned the spent ICWWC pore water sediment samples collected/processed 20 August 2010 to each of their respective sample locations. The remaining field activities for the day consisted of Benchmark collecting sediment pore water samples from two of the ICWWC sediment sample locations. The sediment samples to be used for pore water collection were obtained using the same equipment and methodologies as described for the collection of previous ICWWC sediment samples. As with the sediment samples collected for pore water extraction on 20 August 2010, water was decanted off the top of the sediment samples using a peristaltic pump and two five gallon buckets of sediment were collected at each sample location in order to provide a sufficient volume of material to extract and sample the pore water contained in the sediment. As part of the sampling activities, Benchmark also collected water quality parameters at each of the sediment sample locations during collection of the sediment samples for pore water extraction and sampling. Table 9 summarizes the sediment



samples collected from the ICWWC for pore water extraction and sampling, and Table 10 summarizes the water quality parameters collected as part of this sampling event.

**TABLE 9 SUMMARY OF INTRACOASTAL WATERWAY SEDIMENT SAMPLES COLLECTED FOR EXTRACTION AND COLLECTION OF SEDIMENT PORE WATER (21 AUGUST 2010)**

Sample Location	Date	Sample Time	Number of Ponar Samples	Field Parameters	EA Split Sample Location
EIWSED05PW	21 August 2010	08:40 to 09:10	4	pH: 6.25 Temperature: 29.8°C ORP: 28.4 mV	----
EIWSED04PW	21 August 2010	09:20-09:46	Not Recorded	pH: 6.37 Temperature: 29.5 °C ORP: 19.4 mV	----

**TABLE 10 SUMMARY OF WATER QUALITY PARAMETERS FOR INTRACOASTAL WATERWAY SEDIMENT SAMPLES COLLECTED FOR EXTRACTION AND COLLECTION OF SEDIMENT PORE WATER (21 AUGUST 2010)**

Sample Location/ Time	Depth	Temperature (°C)	Conductivity (µs/cm)	Salinity (ppt)	pH	Dissolved oxygen (mg/L)	ORP (mV)
EIWSED05PW 09:48	3 ft	28.27	43,820	28.17	7.95	5.08	35.4
	1 ft	28.24	43,810	28.16	7.94	4.74	14.3
EIWSED04PW 09:53	2.8 ft	28.20	46,520	28.18	7.94	4.05	1.4
	1 ft	28.25	46,570	28.18	7.94	4.19	-2.9

At 1014 hours, Benchmark arrived back at the boat dock and placed the collected sediment sample on ice. From 1018 hours, Benchmark homogenized sediment sample EIWSED05PW and extracted and filtered sediment pore water using the same equipment and methodologies as described for the pore water samples extracted on 20 August 2010. At 1312 hours, Benchmark completed extraction of a sufficient volume of pore water from the EIWSED05PW sediment, and placed the pore water sample in sample containers. A duplicate of the pore water sample was also containerized.

From 1432 to 1435 hours, Benchmark decontaminated sampling equipment. From 1436 to 1646 hours, Benchmark extracted and filtered pore water from the EIWSED05PW sediment sample and transferred the pore water into appropriate sample containers. At 1703 hours, the field crew left for the day.

## **22 August 2010**

On 22 August 2010, EA arrived at the Site at 0720 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Scott Beauchamp, Benchmark

- Mr. Brett Sutter, Benchmark
- Mr. Mike Chanov, EA, Environmental Scientist

The field activities for the day consisted of Benchmark collecting sediment pore water samples from one ICWWC sediment sample location and processing of the sample. Only one sample was collected and processed due to the lack of additional filters needed to process additional samples; the filters could not be obtained until 23 August 2010. The one sediment sample collected for the day (EIWSED06PW) was obtained using the same equipment and methodologies as described for the collection of previous ICWWC sediment samples. As with the sediment samples collected for pore water extraction on 20 - 21 August 2010, water was decanted off the top of the sediment samples using a peristaltic pump and two five gallon buckets of sediment were collected at the sample location in order to provide a sufficient volume of material to extract and sample the pore water contained in the sediment. As part of the sampling activities, Benchmark also collected water quality parameters at the sediment sample locations during collection of the sediment samples for pore water extraction and sampling. Table 11 summarizes the sediment sample collected from the ICWWC for pore water extraction and sampling, and Table 12 summarizes the water quality parameters collected as part of this sampling event.

**TABLE 11 SUMMARY OF INTRACOASTAL WATERWAY SEDIMENT SAMPLES COLLECTED FOR EXTRACTION AND COLLECTION OF SEDIMENT PORE WATER (22 AUGUST 2010)**

Sample Location	Date	Sample Time	Number of Ponar Samples	Field Parameters	EA Split Sample Location
EIWSED06PW	22 August 2010	08:25 to 09:17	Not Recorded	pH: 6.77 Temperature: 29.5°C ORP: -1.3 mV	----

**TABLE 12 SUMMARY OF WATER QUALITY PARAMETERS FOR INTRACOASTAL WATERWAY SEDIMENT SAMPLES COLLECTED FOR EXTRACTION AND COLLECTION OF SEDIMENT PORE WATER (22 AUGUST 2010)**

Sample Location/ Time	Depth	Temperature (°C)	Conductivity (µs/cm)	Salinity (ppt)	pH	Dissolved oxygen (mg/L)	ORP (mV)
EIWSED06PW 09:13	4.9 ft	28.11	43,570	27.99	8.09	4.87	47.7
	3 ft	28.11	43,570	28.00	8.15	4.73	33.1
	1 ft	28.11	43,570	27.99	8.16	4.52	30.4

At 0922 hours, Benchmark arrived back at the boat dock and placed the collected sediment sample on ice. At 0940 hours, Benchmark homogenized sediment sample EIWSED06PW and extracted and filtered sediment pore water using the same equipment and methodologies as described for the pore water samples extracted on 20 -21 August 2010. At 1151 hours, Benchmark completed extraction of a sufficient volume of pore water from the EIWSED06PW sediment, and placed the pore water sample in the appropriate sample containers at 1154 hours. At 1215 hours, the field crew left for the day.

**23 August 2010**

On 23 August 2010, EA arrived at the Site at 0820 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Brett Sutter, Benchmark
- Mr. Mike Chanov, EA, Environmental Scientist
- Ms. Kaitlin McCormick, EA, Environmental Scientist

The field activities for the day consisted of Benchmark re-collecting reference sediment samples NAS07, NAS08, and NAS09; the samples collected from these locations on 17 August 2010 arrived at the laboratory at a temperature outside acceptable quality control criteria. One wetland sediment sample, which was to be used for pore water extraction, was also collected. From 0820 to 0900 hours, Benchmark prepared for sediment sampling event. From 0908 hours to 0944 hours, Benchmark collected the sediment samples using six inch trowels and placed in five gallon, laboratory-supplied buckets. The sediment was then mixed with a trowel, and sediment collected for the reference samples was transferred from the bucket into sample jars using spoons. The one marsh sample collected for pore water extraction was left in the collection bucket. Sampling equipment used to collect and handle the sediment samples had been decontaminated prior to use at each sample location. Excess sediment not required for pore water extraction was returned to its respective sample location. The sediment samples were homogenized using equipment and methodologies consistent with those described during previous wetlands sediment sampling events. Table 13 provides a summary of the sediment samples collected on 23 August 2010.

**TABLE 13 SUMMARY OF WETLANDS SEDIMENT SAMPLES COLLECTED AS REFERENCE SAMPLES OR FOR PORE WATER EXTRACTION AND COLLECTION (23 AUGUST 2010)**

<b>Sediment Sample (Sample Purpose)</b>	<b>Collection Time</b>
NAS07 (Reference Sample)	09:08
NAS08 (Reference Sample)	09:17
NAS09 (Reference Sample)	09:23
EWSED01PW (Pore Water Extraction)	09:33 – 09:44

At 0953 hours, Benchmark arrived back at the sample processing area and placed the collected wetland samples in ice-chilled coolers. Due to a lack of a sufficient number of filters for filtering the extracted wetland sediment pore water, from 0955 to 1132 hours, Benchmark performed a pore water extraction test for the EWSED01PW sediment in order to evaluate how effectively pore water could be extracted from wetland sediment. This material was returned to the sample location following completion of the extraction test, with the plan to re-collect the pore water sample from this location later in the week.

A decision was made by Benchmark to go back to each of the wetland sediment sample locations, and fill two bottles utilized to centrifuge sediment from each of the sample locations. These samples were collected and placed in a five gallon bucket with decontaminated trowels, then homogenized and placed in the two centrifuge bottles collected for each sample location.

Following collection, the samples were centrifuged to evaluate the effectiveness of pore water extraction from the wetland sediment sample locations. From 1231 to 1430 hours, Benchmark conducted the pore water extraction test by centrifuging each set of sample jars from each sample location for a period of 30 minutes at 3,500 rpms. At 1430 hours, the results of the extraction test was observed and recorded. Table 14 provides a summary of the sediment samples collected for the extraction test.

**TABLE 14 SUMMARY OF WETLANDS SEDIMENT PORE WATER EXTRACTION TEST (23 AUGUST 2010)**

Sediment Sample	Collection Time	Results/Comments
EWSED03PW	11:38 – 11:40	No pore water observed in centrifuged sample
EWSED06PW	11:43	No pore water observed in centrifuged sample
EWSED07PW	11:52 – 11:53	Some water observed in centrifuged sample
EWSED04PW	11:59	Some water observed in centrifuged sample; was able to extract approximately 15 ml from Bottle A, and 15 ml from Bottle B
EWSED09PW	12:10	No pore water observed in centrifuged sample
EWSED05PW	12:17	No pore water observed in centrifuged sample

Benchmark then re-centrifuged the EWSED04PW test samples for 30 additional minutes, and extracted approximately 15 ml of additional pore water from Bottle A, and 10 ml of additional pore water from Bottle B. From 1450 to 1525 hours, test bottles for both EWSED04PW and EWSED07PW were centrifuged for 30 minutes. Field crews reported a cumulative volume of 40 ml pore water recovery for EWSED04PW B test bottle. The field crew left the site for the day at 1645 hours.

#### **24 August 2010**

On 24 August 2010, EA arrived at the Site at 0800 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Brett Sutter, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Ms. Kaitlin McCormick, EA, Environmental Scientist

The field activities for the day consisted of Benchmark collecting wetland sediment samples for Acid Volatile Sulfides/Simultaneously Extracted Metal (AVS/SEM) analyses, and returning ICWWC sediment used to extract pore water to their respective sample locations. From 0802 to 0850 hours, Benchmark decontaminated sampling equipment, collected equipment rinsate blanks, and loaded necessary sampling equipment and field supplies onto an all terrain vehicle (ATV).

Photographs 15 through 18, Appendix A, illustrate techniques utilized by Benchmark to collect and process AVS/SEM samples. At 0855 hours, Benchmark arrived at sample location EWSED04 and initiated collection of the sediment sample for AVS/SEM analysis. This was achieved by taking an acetate tube two inches in diameter by six inches in length, and capping

the top end of the tube. A hole was made in the cap to allow air to escape as the acetate tube was advanced into the subsurface. Benchmark then placed a board over the capped end of the tube, and used a hammer to drive the acetate tube into the subsurface to a depth of six inches below surface grade. They then used a trowel to dig around the outside of the tube and remove the surrounding soil so that the tube could be retrieved. A member of the Benchmark then transferred the collected soil core back to the sample processing area where the ends of the tube were cut, capped, and sealed to ensure no headspace existed in the sample tube. Processing and sealing of the sample tube for EWSED04 occurred immediately after collection of this soil core; the remaining cores were processed from 1110 to 1205 hours following collection of the soil cores in the field. Benchmark also collected temperature, pH, and ORP for the sediment sample location. Benchmark also decontaminated field equipment used to collect soil sample. Table 15 provides a summary for wetland sediment samples collected for AVS/SEM analysis.

**TABLE 15 SUMMARY OF WETLAND SEDIMENT SAMPLES COLLECTED FOR AVS/SEM ANALYSIS (24 AUGUST 2010)**

Sample Location	Date	Sample Time	Field Parameters
EWSED04	24 August 2010	09:03 (Benchmark marked sample time 08:55)	pH: 6.65 Temperature: 30.8°C ORP: Not Recorded
EWSED07	24 August 2010	09:30	pH: 6.80 Temperature: 31.3 °C ORP: 216.2 mV
EWSED03	24 August 2010	09:44	pH: Not collected by Benchmark Temperature: 30.2 °C ORP: Not collected by Benchmark
EWSED06	24 August 2010	09:53	pH: 7.19 Temperature: 31.7 °C ORP: 176.1 mV
EWSED02	24 August 2010	10:05	pH: 6.43 Temperature: 31.4 °C ORP: 10.2 mV
EWSED01	24 August 2010	10:23	pH: 6.85 Temperature: 30.6 °C ORP: -18.0 mV
EWSED09	24 August 2010	10:32	pH: 6.98 Temperature: 37.3 °C ORP: 80.5 mV
EWSED08	24 August 2010	10:42	pH: 6.95 Temperature: 31.7 °C ORP: 10.6 mV
EWSED05	24 August 2010	10:54	pH: 6.23 Temperature: 37.8 °C ORP: 63.4 mV

From 1330 to 1509 hours, Benchmark emptied centrifuge bottles that contained sediment used to extract pore water from the ICWWC sediment samples. This material was placed in its respective sample bucket, and then the sample buckets were loaded onto a boat, and the sediment from each sample location was returned to its respective ICWWC sediment sample location. At 1515 hours, the field crew left the site for the day.

**25 August 2010**

On 25 August 2010, EA arrived at the Site at 0735 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Brett Sutter, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Ms. Kaitlin McCormick, EA, Environmental Scientist

The field activities for the day consisted of Benchmark extracting/collecting a sediment pore water sample for ICWWC sediment location EIWSED07, and from wetland sediment sample location EWSED08. From 0750 to 0830 hours, Benchmark decontaminated field equipment, collected equipment rinsate blanks, and loaded necessary field equipment and supplies on the sampling boat. During this time, Benchmark indicated that they did not submit a equipment rinsate blank associated with the AVS/SEM sediment sample analysis due to the laboratory indicating it could only run the AVS/SEM analysis for solids, and not for liquids.

From 0837 to 0913 hours, Benchmark collected ICWWC sediment sample EIWSED07PW for pore water extraction/collection. Five grab samples of sediment were collected and homogenized in a manner consistent with other ICWWC sediment samples collected on the previous days of this documented field effort. Benchmark also collected water quality from the EIWSED07PW sample location. Buckets containing the collected sediment were placed in an ice-chilled cooler following collection. Table 16 summarizes sediment sample EIWSED07PW, which was collected from the ICWWC for pore water extraction and sampling, and Table 17 summarizes the water quality parameters collected as part of this sampling event.

**TABLE 16 SUMMARY OF INTRACOASTAL WATERWAY SEDIMENT SAMPLES COLLECTED FOR EXTRACTION AND COLLECTION OF SEDIMENT PORE WATER (25 AUGUST 2010)**

Sample Location	Date	Sample Time	Number of Ponar Samples	Field Parameters	EA Split Sample Location
EIWSED07PW	25 August 2010	08:37 – 09:13	5	pH: 6.70 Temperature: 29.1°C ORP: -27.3 mV	----

**TABLE 17 SUMMARY OF WATER QUALITY PARAMETERS FOR INTRACOASTAL WATERWAY SEDIMENT SAMPLES COLLECTED FOR EXTRACTION AND COLLECTION OF SEDIMENT PORE WATER (25 AUGUST 2010)**

Sample Location/ Time	Depth	Temperature (°C)	Conductivity (µs/cm)	Salinity (ppt)	pH	Dissolved oxygen (mg/L)	ORP (mV)
EIWSED07PW 09:23	6.7 ft	27.76	58,970	37.13	7.90	4.14	-182.7
	3.8 ft	27.78	59,000	37.14	7.87	4.07	-220.2
	1 ft	27.77	59,000	37.14	7.85	4.04	-198.7



From 0947 to 1249 hours, Benchmark extracted pore water from the EIWSED07PW sediment sample using equipment and methodologies consistent with those used during previous pore water extraction events observed during this field effort. At 1203 hours, Benchmark encountered trouble with a centrifuge not being balanced. Benchmark rebalanced the centrifuge and resumed extraction of the pore water from the sediment at 1217 hours. At 1249 hours, Benchmark completed extraction and filtering of pore water from the EIWSED07PW sediment sample and transferred the water to one liter amber bottles for submittal to the analytical laboratory for analyses.

At 1312 hours, Benchmark loaded necessary field equipment and supplies onto their ATV in order to collect sediment from wetland sediment sample location EWSED08. At 1319 hours, Benchmark collected sediment sample EWSED08PW, which was to be used to extract and collect pore water from this sample location. The sediment sample was collected using field equipment and methodologies consistent with collection of other wetland sediment samples collected for pore water extraction. Parameters were also collected for the sediment sample, and the three buckets containing the sample were placed in an ice-chilled cooler. EA also noted that this sample contained a high clay content, which made it difficult for Benchmark to adequately homogenize. However, most of the material was used to extract pore water, and the pore water extracted from the sediment was homogenized following extraction. Table 18 provides a summary for the collection of the EWSED08PW sediment sample, including the field parameters collected and recorded for this sediment sample.

**TABLE 18 SUMMARY OF WETLAND SEDIMENT SAMPLES COLLECTED FOR PORE WATER EXTRACTION (25 AUGUST 2010)**

Sample Location	Date	Sample Time	Field Parameters
EWSED08PW	25 August 2010	13:19	pH: 5.41 Temperature: 32.2°C ORP: 140.2 mV

From 1334 to 1750 hours, with one exception, Benchmark extracted pore water from the EWSED08PW sediment sample using equipment and methodologies consistent with those used during previous pore water extraction events observed during this field effort. At 1436 hours, Benchmark modified their methodology of extracting pore water after encountering problems with the recovered pore water being murky. Benchmark overcame this problem by taking the extracted pore water, homogenizing it, and then placing it in a clean centrifuge bottle so that it could be centrifuged further to allow for additional separation of suspended fines in the pore water sample prior to filtering. Benchmark also had to re-balance the centrifuge at 1602 hours. At 1750 hours, Benchmark filtered the pore water sample and placed the filtered pore water sample in a laboratory supplied five gallon container. At 1823 hours, Benchmark transferred the pore water sample to laboratory supplied sample bottles and placed the pore water sample in an ice-chilled cooler. At 1825 hours, the field crew left the site for the day.

**26 August 2010**

On 26 August 2010, EA arrived at the Site at 0745 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Brett Sutter, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Ms. Kaitlin McCormick, EA, Environmental Scientist

The field activities for the day consisted of Benchmark extracting/collecting sediment pore water samples from wetland sediment sample locations. From 0745 to 0808 hours, Benchmark decontaminated field equipment, collected equipment rinsate blanks, and loaded necessary field equipment and supplies on the ATV in order to collect sediment from wetland sediment sample location EWSED02. At 0813 hours, Benchmark collected sediment sample EWSED02PW, which was to be used to extract and collect pore water from this sample location. The sediment sample was collected using field equipment and methodologies consistent with collection of other wetland sediment samples collected for pore water extraction. Parameters were also collected for the sediment sample, and the three buckets containing the sample were placed in an ice-chilled cooler. Table 19 provides a summary for the collection of the EWSED02PW sediment sample, including the field parameters collected and recorded for this sediment sample.

**TABLE 19 SUMMARY OF WETLAND SEDIMENT SAMPLES COLLECTED FOR PORE WATER EXTRACTION (26 AUGUST 2010)**

Sample Location	Date	Sample Time	Field Parameters
EWSED02PW	26 August 2010	08:13	pH: 6.89 Temperature: 27.5°C ORP: -273.8 mV
EWSED01PW	26 August 2010	11:58	pH: 6.59 Temperature: 29.3°C ORP: 88.4 mV

From 0836 1120 hours, Benchmark extracted pore water from the EWSED02PW sediment sample using equipment and methodologies consistent with those used during previous pore water extraction events observed for EWSED08PW. At 1120 hours, Benchmark filtered the extracted pore water sample and placed the filtered pore water sample in a laboratory supplied five gallon container. At 1142 hours, Benchmark transferred the pore water sample to laboratory supplied sample bottles and placed the pore water sample in an ice-chilled cooler.

At 1158 hours, Benchmark collected sediment sample EWSED01PW, which was to be used to extract and collect pore water from this sample location. The sediment sample was collected using field equipment and methodologies consistent with collection of other wetland sediment samples collected for pore water extraction. Parameters were also collected for the sediment sample, and the three buckets containing the sample were placed in an ice-chilled cooler. Table 19 provides a summary for the collection of the EWSED01PW sediment sample, including the field parameters collected and recorded for this sediment sample.



From 1219 to 1744 hours, Benchmark extracted pore water from the EWSED01PW sediment sample using equipment and methodologies consistent with those used during previous pore water extraction events observed for EWSED08PW. At 1737 hours, Benchmark also collected reconnaissance sediment samples from sediment sample locations EWSED04PW and EWSED07PW in order to do a test run on these samples to see if it is still possible to recover pore water from sediment located at these sampling locations. This is in response to sediment moisture loss due to the hot and dry weather conditions.

At 1800 hours, Benchmark filtered the extracted pore water sample for EWSED01PW and placed the filtered pore water sample in a laboratory supplied five gallon container. While filtering of this sample was being performed, Benchmark also centrifuged the reconnaissance sediment samples collected for EWSED04PW and EWSED07PW and was able to recover 40 ml and 45 ml of pore water, respectively, from these samples. Based on these results, Benchmark made a determination that extraction of the minimum volume of pore water required by the laboratory from these locations should be possible in 15 to 16 sets.

At 1825 hours, Benchmark transferred the EWSED01PW pore water sample to laboratory supplied sample bottles and placed the pore water sample in an ice-chilled cooler until shipping. At 1830 hours, the field crew left the site for the day.

## **27 August 2010**

On 27 August 2010, EA arrived at the Site at 0748 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Brett Sutter, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Ms. Kaitlin McCormick, EA, Environmental Scientist

The field activities for the day consisted of Benchmark extracting/collecting sediment pore water samples from wetland sediment sample locations. The Benchmark crew was already decontaminating field equipment, collecting equipment rinsate blanks, and loading necessary field equipment and supplies on the ATV in order to collect sediment from wetland sediment sample location EWSED04. At 0805 hours, Benchmark collected sediment sample EWSED04PW, which was to be used to extract and collect pore water from this sample location. The sediment sample was collected using field equipment and methodologies consistent with collection of other wetland sediment samples collected for pore water extraction. Parameters were also collected for the sediment sample, and the four buckets containing the sample were placed in an ice-chilled cooler. Table 20 provides a summary for the collection of the EWSED04PW sediment sample, including the field parameters collected and recorded for this sediment sample.

**TABLE 20 SUMMARY OF WETLAND SEDIMENT SAMPLES COLLECTED FOR PORE WATER EXTRACTION (27 AUGUST 2010)**

Sample Location	Date	Sample Time	Field Parameters
EWSED04PW	27 August 2010	08:05	pH: 7.05 Temperature: 27.9°C ORP: 103.0 mV

From 0820 to 1440 hours, Benchmark extracted pore water from the EWSED04PW sediment sample using equipment and methodologies consistent with those used during previous pore water extraction events observed for EWSED08PW. The centrifuge had to be re-balanced on several occasions as extraction of the pore water proceeded for this sample. At 1440 hours, Benchmark filtered the extracted pore water sample and placed the filtered pore water sample in a laboratory supplied five gallon container. At 1420 hours, Benchmark transferred the pore water sample to laboratory supplied sample bottles and placed the pore water sample in an ice-chilled cooler. At 1422 hours, Benchmark began packing coolers in preparation of shipment of the collected samples to the analytical laboratory. At 1433 hours, the field crew left the site for the day.

**28 August 2010**

On 28 August 2010, EA arrived at the Site at 0748 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. William Quast, Benchmark
- Ms. Kaitlin McCormick, EA, Environmental Scientist

The field activities for the day consisted of Benchmark extracting/collecting a sediment pore water samples from wetland sediment sample location EWSED07. When EA arrived on site, the Benchmark crew had already loaded necessary field equipment and supplies on the ATV in order to collect sediment from wetland sediment sample location EWSED07. At 0808 hours, Benchmark collected sediment sample EWSED07PW, which was to be used to extract and collect pore water from this sample location. The sediment sample was collected using field equipment and methodologies consistent with collection of other wetland sediment samples collected for pore water extraction. Parameters were also collected for the sediment sample, and the four buckets containing the sample were placed in an ice-chilled cooler. Table 21 provides a summary for the collection of the EWSED07PW sediment sample, including the field parameters collected and recorded for this sediment sample.

**TABLE 21 SUMMARY OF WETLAND SEDIMENT SAMPLES COLLECTED FOR PORE WATER EXTRACTION (28 AUGUST 2010)**

Sample Location	Date	Sample Time	Field Parameters
EWSED07PW	28 August 2010	08:08	pH: 6.96 Temperature: 20.9°C ORP: 257.7 mV

Around 0820 hours, Benchmark received notification from the laboratory that two of the pore water sample bottles shipped on the previous day arrived at the laboratory broken. These samples were associated with ICWWC sediment sample location EIWSED07. As such, plans were made to collect additional sediment and to extract and collect a pore water samples from this location on 30 August 2010.

From 0822 to 0830 hours, Benchmark decontaminated field equipment. From 0830 to 1452 hours, with one exception, Benchmark extracted pore water from the EWSED07PW sediment sample using equipment and methodologies consistent with those used during previous pore water extraction events observed for EWSED08PW. The one exception noted was that Benchmark did not homogenize the sediment prior to transferring the material into the centrifuge bottles. One of the centrifuges had to be re-balanced on several occasions as extraction of the pore water proceeded for this sample. At 1455 hours, Benchmark began filtering the extracted pore water sample and placed the filtered pore water sample in a laboratory supplied five gallon container. At 1519 hours, Benchmark transferred the pore water sample to laboratory supplied sample bottles and placed the pore water sample in an ice-chilled cooler. The sample was to be held for shipment until Monday 30 August 2010. At 1530 hours, the field crew left the site for the day.

### **30 August 2010**

On 30 August 2010, EA arrived at the Site at 0850 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Mr. Brett Sutter, Benchmark
- Ms. Kaitlin McCormick, EA, Environmental Scientist

The field activities for the day consisted of Benchmark extracting/collecting a sediment pore water sample from ICWWC sediment sample location EIWSED07, due to the bottles containing the original sample being broken during shipment. Benchmark also collected wetlands area surface water samples for laboratory analysis.

When EA arrived on site, the Benchmark crew was preparing for the collection of sediment from the EIWSED07 sample location. At 0916 Benchmark mobilized to surface water sample location EWSW01. At 0924 hours, Benchmark set sample tubing (Photo 19, Appendix A) and made a decision to come back to the site at a later time to allow the water turbidity to decrease prior to collecting the surface water sample at this location. From 0926 to 0934 hours, benchmark conducted a reconnaissance of the other surface water sample locations and made a determination that surface water samples EWSW04 could be sampled due to high tide conditions, and also noted that sediment sample location EWSED06 now contained water, and that pore water extraction and collection from this area was now possible.

At 0932 hours, Benchmark went back to field office and reviewed the map showing proposed surface water locations. They indicated that one additional surface water sample location might

also be favorable for sampling. At 0937 hours, Benchmark mobilized to surface water sample location EWSW-04 and placed sample tubing into surface water and then attached the other end to a wooden stake used to mark the sample location. They indicated the surface water sample would be collected once surface water turbidity had decreased from setting the sample tube. At 0941 hours, Benchmark mobilized to surface water sample EWSW03. This area was dry, and a surface water sample could not be collected from the area.

From 0944 to 0952 hours, Benchmark conducted a daily health and safety meeting, and departed for the sampling boat in order to collect sediment from ICWWC sediment sample location EIWSED07 for pore water extraction and collection. From 1008 to 1054 hours, Benchmark collected ICWWC sediment sample EIWSED07PW for pore water extraction/collection. Nine grab samples of sediment were collected and homogenized in a manner consistent with other ICWWC sediment samples collected on the previous days of this documented field effort. Benchmark also collected water quality from the EIWSED07PW sample location. Two buckets containing the collected sediment were placed in an ice-chilled cooler following collection. Table 22 summarizes sediment sample EIWSED07PW, which was collected from the ICWWC for pore water extraction and sampling, and Table 23 summarizes the water quality parameters collected as part of this sampling event.

**TABLE 22 SUMMARY OF INTRACOASTAL WATERWAY SEDIMENT SAMPLES COLLECTED FOR EXTRACTION AND COLLECTION OF SEDIMENT PORE WATER (30 AUGUST 2010)**

Sample Location	Date	Sample Time	Number of Ponar Samples	Field Parameters	EA Split Sample Location
EIWSED07PW	30 August 2010	10:08 – 10:54	9	pH: 6.37 Temperature: 30.7°C ORP: 113.5 mV	----

**TABLE 23 SUMMARY OF WATER QUALITY PARAMETERS FOR INTRACOASTAL WATERWAY SEDIMENT SAMPLES COLLECTED FOR EXTRACTION AND COLLECTION OF SEDIMENT PORE WATER (30 AUGUST 2010)**

Sample Location/ Time	Depth	Temperature (°C)	Conductivity (µs/cm)	Salinity (ppt)	pH	Dissolved oxygen (mg/L)	ORP (mV)
EIWSED07PW 11:07	7.9 ft	29.57	59,360	36.00	6.59	7.71	-196.3
	3.5 ft	29.67	58,490	36.00	6.52	8.06	-199.1
	1 ft	29.74	59,350	35.95	6.52	8.01	-204.3

At 1130 hours, Benchmark arrived back at field office. At 1145 hours, two of the Benchmark crew collected an equipment rinsate blank in preparation for collection of surface water samples, while the third member homogenized the EIWSED09PW sediment sample.

At 1203 hours part of the Benchmark crew mobilized to surface water sample location EWSW01. From 1210 to 1242 hours, collection of surface water was initiated for the sample location. Photograph 20, Appendix A, illustrates surface water collection techniques utilized by Benchmark. Fifteen gallons of water, to be used for toxicity testing, was collected using a

peristaltic pump. This water was placed in three laboratory-supplied plastic buckets. At 1242 hours, Benchmark collected water quality parameters by filling a cup with water from the sample location, and then measuring the parameters. At 1252 hours, Benchmark filled other sample containers required for analysis of the surface water sample at this location. They also containerized a sufficient volume of surface water from this location for analysis of a MS/MSD, and field duplicate sample. At 1305 hours, Benchmark returned to their field office to retrieve an additional sample container required for the ESW01 surface water sample. They completed sample collection at this location at 1329 hours.

From 1333 to 1404 hours, Benchmark collected surface water sample EWSW04 using the same field equipment and methods as described for the collection of surface water sample EWSW01. Table 24 summarizes data associated with the collection of the surface water samples.

**TABLE 24 SUMMARY OF WATER QUALITY PARAMETERS FOR WETLANDS SURFACE WATER SAMPLES (30 AUGUST 2010)**

Sample Location/ Time	Date	Temperature (°C)	Conductivity (µs/cm)	Salinity (ppt)	pH	Dissolved oxygen (mg/L)	ORP (mV)
ESW01 12:10 – 13:29	30 August 2010	35.37	77,380	43.20	5.86	3.78	-262.5
ESW04 13:33 – 14:04	30 August 2010	35.91	75,530	41.69	7.19	5.00	-280.6

From 1411 to 1557 hours, Benchmark extracted pore water from the EIWSED07PW sediment sample using equipment and methodologies consistent with those used during previous pore water extraction events observed during this field effort. As with other centrifuge events, the centrifuge had to be occasionally re-balanced. At 1615 hours, Benchmark completed filtering of the extracted pore water and at 1622 hours, transferred the filtered pore water to appropriate sample containers. At 1630 hours, Benchmark began packaging samples for overnight shipment to the laboratory. EA left the site for the day at 1635 hours, while Benchmark continued to ready samples for shipment to laboratory.

### **31 August 2010**

On 31 August 2010, EA arrived at the Site at 0745 hours. Participants included:

- Mr. Neil Henthorne, Benchmark
- Mr. Scott Beauchamp, Benchmark
- Ms. Kaitlin McCormick, EA Environmental Scientist

The field activities for the day consisted of Benchmark extracting/collecting a sediment pore water samples from wetland sediment sample location EWSED06. When EA arrived on site, the Benchmark crew was calibrating the YSI water quality meter and preparing for collection of sediment from wetland sediment sample location EWSED06. At 0837 hours, Benchmark collected sediment sample EWSED07PW, which was to be used to extract and collect pore water from this sample location. The sediment sample was collected using field equipment and methodologies consistent with collection of other wetland sediment samples collected for pore

water extraction. Due to standing water at the site, Benchmark drained this excess water from the sediment prior to placing it in the sample buckets. Parameters were also collected for the sediment sample and for water contained over the sediment, and the three buckets containing the sample were placed in an ice-chilled cooler. Table 25 provides a summary for the collection of the EWSED06PW sediment sample, including the field parameters collected and recorded for this sediment sample.

**TABLE 25 SUMMARY OF WETLAND SEDIMENT SAMPLES COLLECTED FOR PORE WATER EXTRACTION (31 AUGUST 2010)**

Sample Location	Date	Sample Time	Field Parameters
EWSED06PW	31 August 2010	08:37	<u>Soil</u> pH: 6.40 Temperature: 29.1°C ORP: 30.8 mV <u>Water</u> pH: 7.17 Temperature: 27.84 °C Conductivity: 51,660 µS/cm Salinity: 31.93 ppt D.O.: 3.80 mg/L ORP: -52.4 mV

From 0906 to 1153 hours, Benchmark extracted pore water from the EWSED06PW sediment sample using equipment and methodologies consistent with those used during previous pore water extraction events observed for EWSED08PW. One of the centrifuges had to be re-balanced as extraction of the pore water proceeded for this sample. At 1207 hours, Benchmark began filtering the extracted pore water sample and placed the filtered pore water sample in a laboratory supplied five gallon container. At 1229 hours, Benchmark transferred the pore water sample to laboratory supplied sample bottles and placed the pore water sample in an ice-chilled cooler. Field work was completed for this sampling event, and at 1235 hours, Benchmark started packaging samples for shipment to laboratory. They were also planning on cleaning up and shipping other equipment in order to demobilize from the site. At 1237 hours, EA demobilized from the site, completing field oversight activities.

## REFERENCES

- Pastor, Behling & Wheeler, LLC (PBW). 2005. "Remedial Investigation and Feasibility Study (RI/FS) Work Plan for the Gulfco Marine Maintenance Superfund Site, Freeport, Texas." May.
- PBW. 2006. "Sampling and Analysis Plan – Volume 1. Field Sampling Plan for the Gulfco Marine Maintenance Superfund Site, Freeport, Texas." May.
- PBW. 2010. Memorandum to Mr. Gary Miller, U.S. Environmental Protection Agency (U.S. EPA): "Advance Notice of Baseline Ecological Risk Assessment Field Activities, Gulfco Marine Maintenance Site, Freeport, Texas." 11 August.
- URS Corporation. 2010. "Final Baseline Ecological Risk Assessment Work Plan & Sampling and Analysis Plan for the Gulfco Marine Maintenance Superfund Site, Freeport, Texas." May.

## **APPENDIX A**

### **Field Oversight Photographs**



# **Appendix A**

## **Photographs**



Photograph 1 Date: 13 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Wetlands sediment sample collection



Photograph 2 Date: 13 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Wetlands sediment sample homogenization



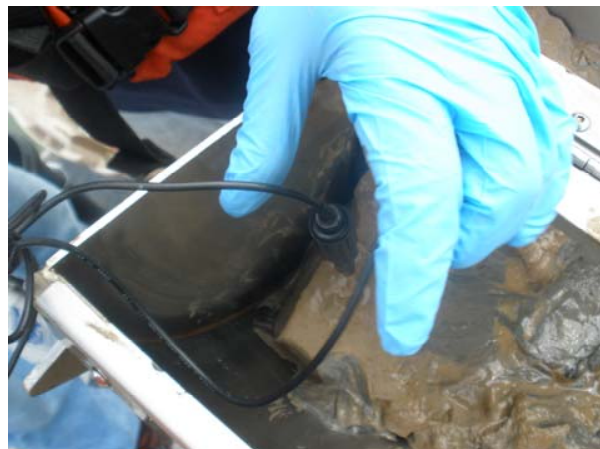
Photograph 3 Date: 13 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Representative view of wetlands sediment



Photograph 4 Date: 18 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: ICWWC sediment sample collection



Photograph 5 Date: 18 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Decanting of water using peristaltic pump



Photograph 6 Date: 18 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Collection of sediment parameters





Photograph 7 Date: 18 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: ICWWC sediment transfer to sample bucket



Photograph 8 Date: 18 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: ICWWC sediment sample homogenization



Photograph 9 Date: 18 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Water/sediment parameter instrumentation



Photograph 10 Date: 20 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Sediment transfer to centrifuge bottles



Photograph 11 Date: 20 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Sediment bottles loaded in centrifuge



Photograph 12 Date: 20 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Pore water separation following centrifuging



Photograph 13 Date: 27 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: ICWWC sediment transfer to sample bucket



Photograph 14 Date: 20 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Transfer of filtered pore water to sample bottles



Photograph 15 Date: 24 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Wetlands sediment tube for AVS/SEM analysis



Photograph 16 Date: 24 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Advancement of AVS/SEM sample tube





Photograph 17 Date: 24 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: AVS/SEM sample tube retrieval



Photograph 18 Date: 24 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: AVS/SEM sediment sample processing



Photograph 19 Date: 30 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Surface water sample tube placement

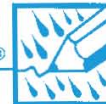


Photograph 20 Date: 30 August 2010  
Site: Gulfco Marine Maintenance Superfund Site  
Description: Collection of surface water samples

## **APPENDIX B**

### **Field Oversight Notes**

"Rite in the Rain"  
ALL-WEATHER WRITING PAPER



IF FOUND, PLEASE RETURN TO:

Name EA ENGINEERING,  
SCIENCE, & TECHNOLOGY, INC.

Address 405. STATE HWY 121 BYPASS  
SUITE C-100, LEWISVILLE, TX 75067

Phone (972) 315-3922

Project GULFCO MARINE MAINT.  
FREEDPORT, TEXAS

EPA T.O. # 0006-RICO-06JZ

EA PROJ. # 1434206

"Rite in the Rain" - a unique all-weather writing surface created to shed water and to enhance the written image. Makes it possible to write sharp, legible field data in any kind of weather.

a product of

J. L. DARLING CORPORATION  
TACOMA, WA 98424-1017 USA  
[www.RiteintheRain.com](http://www.RiteintheRain.com)



Gulfco Marine 08/13/10

0750 Depart Houston for site

0915 Arrive on site

WEATHER: Sunny, hot and humid high  
of 96°F. Heat index 106°F.  
Chance of rain 20%. Raining  
at site upon arrival

PLAN FOR THE DAY: Split sample locations  
as directed by EPA

Personnel on site: EA Duane Thomas

Besi (Benchmark): Ryan Zak  
Brett Suttar

~~PBW~~ Neal Hunthorne  
PT 08/15/10

- Further EA staff will be arriving around  
noon

- no PBW staff onsite as of yet

0930 Got status of sampling update from  
Neal Hunthorne (Benchmark).

3 samples on EPA Split list have  
already been collected

EWSE002, EWSE005, EWSE006  
were collected on 08/12/10. Samples  
were replaced with: EWSE003,  
EWSE004. EWSE002 was

Gulfco Marine 08/13/10

removed entirely from list.

0935 - Benchmark mobs to location: EWSE003

EA on phone confirming changes  
to sample list. Will begin oversight  
and split sampling on next location.

\* Photo: Benchmark sampling set up

Samples are taken from ground with a  
stainless steel trowel to a max depth  
of 6". Homogenized with a stainless  
steel plaster mixer attached to a  
drill. After samples are homogenized  
samples are spooned into jars. Field  
samples are initially collected and put  
into 3 gal buckets supplied by  
the lab.

1020 Mob to location EWSE003

\* Photo: Sampling of location

1023 EWSE003 SAMPLE TIME

\* Photo: Homogenization of EWSE003

1030-1042 Sample processing

1050 Mob to location EWSE004

\* Photo EWSE004 SAMPLE LOCATION

1051 EWSE004 SAMPLE TIME

\* Hitting reddish clay at 1-2" deep

"Rite in the Rain"



Gulfco Marine

08/13/10

\* Photo: 0-6" on trowel

1053 - 1120 Homogenizing & sampling of  
EWSEDO4

1123 Mob to location EWSEDO7

\* Photo: Sampling of EWSEDO7

1125 SAMPLE TIME EWSEDO7

\* photo 0-6" on trowel

1-2" sediment then red clay

- organic layer on top (real dark black)

1148 - 1148 Homogenizing & sampling of  
EWSEDO7

\* photo of site & homogenizing

\* photo of site

- site recently dried out

- dead fish

1202 Mob to NASOI

- need to check <sup>sites</sup> ~~site~~ w/URS

- presence of shale over top of  
site.

- will check to see if shale  
can be brushed away

\* Photo of site

1110  
\* HED

M. Chanor on site to EA

Gulfco Marine

8/13/10

1205 - Mob to NASOI

\* photo of site

- Did not sample site because equipment  
blank only done for metals

1213 - URS Personnel on site

- David Lingle

- Margaret Roy

1224 - Discussion over NASOI sampling

- Besi (Benchmark) concerned over  
shavings/shale on top of NASOI

- David Lingle & Margaret Roy both  
agreed that the best plan of action is  
to remove all large surface shale/  
shaving particles from the top of NASOI  
& then sample the 6" sample

1226 - Mob to location NASOI

\* photo of site

- Removal of scalings done using trowel &  
hands to brush surface & expose smaller particles  
All large scalings removed prior to collection

*"Rite in the Rain"*

Gulfco, Marine

8/13/10

\* Photo of site

\* Photo of removal of scalings

- site sediments very hard packed

- large metal particles found at NASOI removed from sample collection

NASOI

1230 - started to rain @ NASOI

1232 - SAMPLE TIME @ NASOI

1227 - 1240 Sample collection & homogenizing @ NASOI

1237 - Duane voiced concern over homogenization making sure to not just collect from top half for analysis & testing w/ Margaret Roy  
analysis 8/13/10 MLC

1238 - Organic / tree root piece removed from sample, glass & other debris also excluded from sample when not found.

1242: Two samples collected from NASOI

- NASOI 8/13/10 1232

- NASOI 8/13/10 1232 Dup.

Gulfco Marine

8/13/10

1250 - left site for day

- discussed w/ Neil Heathorne about sampling this weekend & he stated there would be no sampling until Monday (8/16/10)

- stated there would be no further sampling on 8/13/10

- Neil Heathorne gave tour of site to Margaret Roy & David Lingle

1300 - 1415 - sample packaging & processing for shipping

1352 - Sample chain of custody signed & sealed in cooler

1445 - Sample cooler dropped off at FedEx for Saturday delivery.

END OF DAY

MLC

"Kitt in the Rain"



Gulfco Marine

8/16/10

- 1415 - Depart Hotel for site

1436 - Arrive @ site

WEATHER: Sunny, Hot & Humid. High of  
94°F. Heat index of 100°F. Chance  
of rain 40%. Raining upon  
arrival @ site.

PLAN FOR DAY: Collect some of the  
remaining sediment samples.

PERSONEL ON SITE: EA Michael Chanow

BES1 (Benchmark) Neil Hawthorne

Scott Beauchamp

Brett Sutter

1430 - 1520 Equipment Cleaning & Blanks prepared

- Trowel, plaster mixer & spoons scrubbed  
w/ alconox & DI H<sub>2</sub>O in a bucket &  
rinsed w/ DE H<sub>2</sub>O.

\* photo of site

1522 Mob to NAS02

- plants/vegetation removed from site to get  
to soil.

\* photo of site NAS02 post removal

Gulfco Marine

8/16/10

1528 - SAMPLE TIME @ NAS02

\* photo 0-6" on trowel

\* photo of sample homogenation

\* photo of site NAS02 post collection

NAS02 site sediment sand w/ some clay

1528 - 1551 Sample collection & homogenation

1554 - Mob to NAS03

\* photo of site

- vegetation & plants removed from site to  
expose soil.

\* photo of sample on trowel 0-6"

0-1" light brown sandy silt

1-4" Brown red sandy clay.

4-6" light brown sandy clay w/ oxidized  
red patches

1600 - SAMPLE TIME @ NAS03

\* photo post vegetation removal &  
during collection

Sample taken by inserting trowel to  
depth & working outward from center  
to get sample

"Rit in the Rain"

Gulfco Marine

8/16/10

1600-1612 - NAS03 collection + homogenization

1615 - Mob to NAS05

\* photo of site

1618 - SAMPLE TIME @ NAS05

$\frac{1}{8}$ " sand (light brown)

$\frac{1}{8}$ -6" darker clay

\* photo of 0-6" on trowel

\* photo of collection @ site

1618-1632 NAS05 collection + homogenization

1630 - Soil sample inadvertently placed in unlabeled jar. Sample in wrong jar placed back at site NAS05 + the jar was thrown away.

1633 - Mob to NAS04

- Dried algae removed from top of site x photo

\* photo of sample on trowel.

$\frac{1}{8}$ " of light gray sand

$\frac{1}{8}$ -3" light brown layer

Gulfco Marine

8/16/10

- Only could collect down to 3".

- Surrounding area around NAS04 had more cobble + stone than @ the site.

\* photo of site + surrounding area

1636-1650 NAS04 collection + homogenization

1654 - Mob to NAS06

1700 Sample Time for NAS06

1700-1711 NAS06 Collection + homogenization

- Fine white layer on top, followed by a dark brown clay layer 0-6"

\* photo of site w/ vegetation

\* photo of site post collection

1725 - Left site for the day

- collection to resume @ 0800 8/17/10

END OF DAY

MLL

"Not in the Rain"



Gulfco Marine

8/13/10

0740 - Leave hotel for site

0800 - Arrive @ site

WEATHER: Sunny, hot & humid. High of  
93°F. Heat index of 107°F.  
Chance of rain 50%

PERSONEL ON SITE: EA Michael Chanov  
BES1 (Benchmark) Neil Hinthorne  
Scott Beauchamp  
Brett Sutter

PLAN FOR DAY: Finish Sampling soil  
sites & background stations & move  
onto IWWC locations in afternoon

0805 - 0840 Equipment cleaning & blanks

0830 - Equipment Blank Time.

0845 - Mob to NAS07

\* photo of site

\* photo on trowel 0-6"

0-1.5": light brown layer of sandy clay

1.5"-6": dark brown layer of sandy clay

Gulfco Marine

8/17/10

• Vegetation removed from NAS07

0900 SAMPLE TIME @ NAS07

0845 - 0915 NAS07 collection Time & homogenization

0920 - Mob to NAS08

0931 - SAMPLE TIME @ NAS08

0930 - 0952 Sample NAS08 collection & homogenization

- Vegetation removed from site to expose soil

\* photo of site before vegetation removing

\* photo of site after vegetation removing

\* photo of 0-6" on trowel @ NAS08

Sediment type consistent throughout

0-2" dark redish color

2"-6" lighter redish color to depth

\* photo 0-6" on trowel

Sample did not mix well during homogenization

\* photo of bucket & mixer

0956 Mob to NAS09

"Rite in the Rain"

Gulfco Marine

8/17/10

100Z - SAMPLE TIME @ NAS09

100Z - 1020 Sample collection & homogenization

- Vegetation removed from site

\* photo of site.

\* photo of vegetation removal process

\* photo of 0-6" outcrown

\* photo post collection

0-2.5" dark brown layer

2.5-6" Reddish brown layer

1030 - Left site for sample processing & shipping, will reconvene for FWWC sample collection.

1530 - Return to site.

1530-1630 - Recon, determined where sites were, there accessibility w/ the tidal influence.

1637 - Left site for day. Sampling to resume @ 0800, 8/18/10

END OF Day

Gulfco Marine

8/18/10

0730 - Leave hotel for site

0750 - Arrive @ site

WEATHER - Sunny, hot & humid. High of 92°F. Heat index of 105°F. Chance of Rain 40%

PERSONNEL ON SITE: EA Michael Chano  
Bes (Benchmark) Neal Hawthorne  
Scott Beardsley  
Brett Suther

PLAN FOR DAY: Collect some of the FWWC sites for shipment in noon & collect more sites in the afternoon. EPA Split sample will be collected in the morning site: E1WSE102.

0800 - Mob to E1WSE103

0815 - Sample time @ E1WSE103  
\* photocollection apparatus  
\* photo of grab #1

"Rite in the Rain"



Gulko Marine

8/18/10

- Grab #2 over top - disposed of off side in channel.
- Grab #3 - full to top \* photo
- Grabs taken in 10ft radius around pole working out to 11.  
\* photo in bucket

\* Grab #4

- water removed from top of sample w/ peristaltic pump
- Excess sediment disposed of in bucket for grabs: 1, 3, 4
- Sediment not taken from areas touching metal grab sampler
- pH: 6.90
- 31.1°C - 10.8mV

0.5" light brown silt/clay 0.5-6" dark brown

0811-0859 Sample EIWSED03 collection & homogenization. - 3 grabs taken

- sample homogenized in same way as soil samples w/ a stainless steel plastic mixer attached to a drill.

\* photo post homogenization

\* photo sample collection for analysis

Gulko Marine

8/19/10

- Sampling equipment cleaned w/ DI + Decon soap. Soap rinsed off apparatus w/ DI over edge of boat.

0907 - Mob to EIWSED02

0910 - SAMPLE TIME EIWSED02

- water removed from grab sample w/ peristaltic pump. \* photo

Extra sediment dumped in channel near site after collection

EIWSED02 - 0.5" light brown sandy, silty clay  
0.5-6" dark brown/gray sandy

0910-0948 - EIWSED02 collection & homogenization

- split sample collected - (D802, U) 402
- 3 grabs taken

\* photo of EIWSED02 grab

\* photo of EIWSED02 collection in grab

- sediment not taken from areas touching sides of grab sampler.

\* photo of grab w/ water overtop

"Rite in the Rain"



Gulfo Marine

8/18/10

- \* photo of sampling procedure
- Sample placed in cooler w/ ice after collection + during transport to dock

EWSED02 sediment measurements \* photo

pH: 6.8 Temp: 31.3°C millivolts: -4.5mV

\* photo of homogenizer

\* photo post homogenization

0947-0956 Water quality taken at EWSED03

- Total depth 2ft 9"

Depth 1ft 9" 1ft

Temp 30.8°C 30.16°C

- only two

Cond 43600µm/cm 43900µm/cm

measurements taken

Salinity 25.20ppt 25.19ppt

pH 8.09 8.03

app

DO 4.76mg/L 4.81mg/L

ORP 123.8 19.9

- 0958 Mob to EWSED02 Again

0959-1008 Water quality taken at EWSED02

- Total depth: 4ft 6"

Gulfo Marine

8/18/10

Depth	3ft 6"	1 ft	
Temp	30.09°C	30.15°C	
Cond	43660µm/cm	43680µm/cm	* Only 2
Salinity	25.21ppt	25.23ppt	measurements
pH	8.06	8.01	taken @ EWSED02
DO	4.35mg/L	4.29mg/L	
ORP	74.9	53.6	

\* photo of EWSED03

\* photo of EWSED02

- 1010 Back to dock to drop off samples + pick up supplies

1020-Mob to EWSED01

\* photo of side EWSED01

\* photo of grab @ EWSED01

1030-SAMPLE TIME EWSED01

1030-1132 EWSED01 sample collection + homogenization

- There was a lot of clay on left side of side

a photo of clay in grab sample

- Site water rinse between grabs

- Six grabs taken on left side of side

- Two grabs taken on right side of side

- right side had sandy silty clay similar to EWSED02 + EWSED03

"Rit in the Rain"

Gulfo Marine

8/18/10

• photo of EIWSED01 grab #8

• photo of EIWSED01 in bucket

- EIWSED01 - 8 grabs taken

- EIWSED01 Sediment measurements

pH: 6.70 Temp: 31.4°C millivolts: 2.6 mV

1135-1139 - EIWSED01 WQ measurements

Total depth	7ft 9"	4ft	1ft
Depth	6ft 9"	4ft	1ft
Cond	43940 µS/cm	43790 µS/cm	43790 µS/cm
Salinity	25.4 ppt	25.42 ppt	25.41 ppt
Temp	30.11°C	30.11°C	30.11°C
pH	7.99	7.98	7.97
DO	5.74 mg/L	5.39 mg/L	5.11 mg/L
ORP	41.0	33.7	29.6

1142 - Mob to EIWSED04

• photo of EIWSED04

1156 - Sample time EIWSED04

1156-1210 EIWSED04 Collection & homogenization

- Water removed from top of grab and peristaltic pump

→ sample was a light brown & dark brown sandy silty clay

Gulfo Marine

8/18/10

- photo of EIWSED04 in grab sampler

\* photo of EIWSED04 in Bucket

EIWSED02 - Two grabs taken

- 1212 - Sediment measurements @ EIWSED04

pH: 6.86 Temp: 31.4°C millivolts: -6.5 mV

1215 - Mob to EIWSED05

1223 - SAMPLE TIME @ EIWSED05

- Water removed from top of sample

1233-1245 EIWSED05 sample collection & homogenization

\* photo EIWSED05 in grab sampler

\* photo EIWSED05 during collection from grab

1248 - EIWSED05 sediment measurements

pH: 6.89 Temp: 31.5°C millivolts: -8.5 mV

1250-1253 - WQ @ EIWSED05

- Total depth: 3.6 ft 3ft 6"

Depth	2.46"	1ft
Temp	30.4°C	30.62°C
Cond	40820 µS/cm	39960 µS/cm
Salinity	25.4 ppt	25.35 ppt
pH	7.96	7.97
DO	5.9 mg/L	5.15 mg/L
ORP	N/A	7.9

- only two measurement depths taken

"Return the River"



Gulfco Marine

8/18/10

1255 - Mob back to EIWSED04

1255-1303 - WQ @ EIWSED04

Total depth ~~24ft~~ 24ft 8"

Depth 14ft 4"

Cond 4480 µS/cm

- only one

Salinity 25.4 ppt

measurement taken

pH 7.95

DO 4.70 mg/L

ORP 0.7

Temp 30.47°C

1305 - Back to dock to drop off samples

1330 - Break for lunch

1410 - Back from lunch

1410-1430 - prep boat for sampling trip

1430 - Mob to EIWSED06

\* photo of EIWSED06

1437 - SAMPLE TIME EIWSED06

- Sample is a sandy, silty, clay

- water removed from top of grab prior to collection

\* photo of grab @ EIWSED06

Gulfco Marine

8/18/10

1452 - left EIWSED06 to allow water to settle after being disturbed by boat.

1503 - Back to EIWSED06

- Two grabs attempted w/ no success

- Grabs @ EIWSED06 in sample (2)

- Large shells removed by hand from EIWSED06

- 1437-1515 Sample collection + measurements @ EIWSED06

1517 - Sediment measurements @ EIWSED06

pH: 7.04 Temp: 31.9°C salinity: 24.3

1520-1527 - WQ @ EIWSED06

Total depth: 4ft 6"

Depth 3ft 6" 1ft

Temp 31.59°C 31.51°C

Cond 42950 µS/cm 38610 µS/cm

Salinity 24.0 ppt 24.1 ppt

DO 7.23 mg/L 6.67 mg/L

pH 7.97 8.01

ORP -22.4 -16.3

- Two depths @ which measurements taken

"Rite in the Rain"

Gulko Marine

8/18/10

1530 - Into shore to get PVC cuplinks

1545 - Mob to EIWSED07

1600 - SAMPLE TIME EIWSED07

1600 - 1630 - EIWSED07 collection + horizonation

\* photo of EIWSED07

\* photo of WQ meter setup

- EIWSED07 - two grabs taken

- sediment sandy, silty, clay

\* photo of water removal of EIWSED07

\* photo of EIWSED07 in grab sampler

1633 - EIWSED07 sediment measurements

pH: 6.82 Temp: 31.8°C salinity: -4.3‰

- EIWSED07 WQ taken 1636 - 1639

depth 6ft 3" 3ft 1ft

Cond 42840  $\mu S/cm$  42770  $\mu S/cm$  42690  $\mu S/cm$

Salinity 23.95 ppt 23.92 ppt 23.88 ppt

Temp 31.62°C 31.63°C 31.63°C

pH 8.07 8.06 8.04

DO 6.45  $mg/L$  6.44  $mg/L$  6.86  $mg/L$

ORP -14.5 -21.8 -21.4

Total depth 7ft 3"

(3) measurement depths taken

Gulko Marine

8/18/10

1640 - Back to dock for day

- All FCW sites marked w/ 10ft sections of PVC Piping.

- Sediment measurements conducted on last grab sample of each site.

- sediment measurements conducted in grab sampler after all sediment was collected in bucket in an undisturbed section.

- 1700 - LEFT SITE FOR DAY

- 1730 - 1600 - sample packaging + processing for shipping

1800 - Chain of custody signed + sealed in cooler

1816 - Sample cooler dropped off @ Fed ex for overnight shipping

END OF DAY MK

"Return the Rain"



Gulfco Marine

8/19/10

- No sampling to occur
- 0940 - Recon of wetland sites postponed until 1300 today.

WEATHER: Rainy, hot, humid. High of 91°F. Heat index of 100°F. Chance of Rain 60-70%. Raining upon arrival on site.

PERSONNEL ON SITE - FA - Michael Chavers  
- BESI - Neil Hawthorne  
- Brett Suther  
- Scott Beauchamp

- 1420 - 1453 - Recon of wetland sites

EWS03 - (2)

ENSE06 - (2)

EWS04 - Small amount of water overlying

EWS01 - (1) - overlying water

ENSE02 - (1)

ENSE01 - (1)

ENSE09 - (2)

ENSE08 - (1)

ENSE04 - (2)

EWS07 - (2)

EWS05 - (2)

~~EWS06 - (2)~~

Gulfco Marine

8/19/10

- (1) Wet all the way to surface w/ some overlying water
- (2) - Moist all the way from surface to below 6"
- (3) - Dry somewhere between 0-6"

- 1520 - Left site for day. Raining unable to collect first pore water sample.

SAMPLING TO RESUME @ 0730 8/20/10.

END OF DAY  
MK

"Rite in the Rain"

Gulfto Marine

8/20/10

- 0710 - Left Hotel for site

- 0730 - Arrive @ site

WEATHER: Sunny, Hot & Humid. High  
of 93°F. Heat index of 105-110°F.  
Chance of Rain 30%.

PERSONEL ONSITE: EA - Michael Chanov

BESI - Neil Henthorne

Brett Suter

Scott Beauchamp

PLAN FOR DAY: Collect some of the  
ICWW Pore water sites & spin down  
for pore water sampling.

- 0800 Mob to ELWSED 01 PW

0820 SAMPLE TIME ELWSED 01 PW

0820 - 0850 Sample ELWSED 01 Collection w/  
No homogenation

No homogenation

- water removed from top of sample  
prior to collection

# FIELD BOOK

#101595

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MAINTENANCE  
14342016

FREEPORT, TX

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Gulfco Marine

8/20/10

0855- Sediment measurements EIWSED01PW

pH: 7.21 Temp: 30.2 millivolts: 28.2

- Two grabs taken from left of site
  - very large amount of clay
- Two grabs taken from right of site
  - much larger portion of fine silt.

0910-0910 EIWSED01PW WQ Taken

- Total depth: 7.0 ft

Depth	0 ft	3 ft	1 ft	
Temp	28.8°C	28.8°C	28.81°C	1st measurements
Cond	46710 us/cm	46710 us/cm	46680 us/cm	taken w/
Salinity	27.99 ppt	27.94 ppt	27.94 ppt	cap on redone
pH	7.76	7.76	7.76	← CR
DO	4.79	4.82	4.62	
ORP	-34.5	-49.4	-56.1	

- Two five gallon buckets (3/4 full) collected @ each site
- Grab sample collected in same way as previous ICWV site collections on 8/18/10.
- Sediment touching side of grab sampler excluded from sample.

0915- Mob to EISED02PW

0925- SAMPLE TIME EISED02PW

0925-0945- EIWSED02PW collection

Gulfco Marine

8/20/10

0947- Sediment measurements taken

pH: 7.01 TEMP: 30.2°C millivolts: -16.5

0948- EIWSED02PW WQ Taken

Total depth: 4.6 ft

Depth	3.6 ft	1 ft
Temp	28.89°C	28.87°C
Cond	46720 us/cm	46700 us/cm
Salinity	27.92 ppt	27.90 ppt
pH	7.76	7.76
DO	5.24	5.03
ORP	-87.5	-90.0

0956- Mob to EIWSED03PW

1010- SAMPLE TIME EIWSED03PW

1010-1040 EIWSED03PW Collection

1024- left EIWSED03PW to allow stirred sediment to settle

1030- Mob back to EIWSED03PW

1038- Sediment measurements EIWSED03PW

pH: 7.07 Temp: 30.3°C millivolts: -21.2

Four grabs collected at site

- First two less than 6"
- Last two greater than 6"



Gulfco Marine

8/20/10

1040 - EIWSED 03 PW WQ Taken

Total depth 3 ft

Depth	1.5 ft
Temp	29.13°C
Cond	43290 $\mu$ S/cm
Salinity	27.76 ppt
pH	7.74
DO	5.50 mg/L
ORP	6.6

1049 - In to dock to drop of samples & start pore water extraction

-1104- Arrive @ dock

- samples placed in coolers w/ ice

1113 - EIWSED 01 PW Homogenized

- mixed w/ plaster mixer (stainless steel) as previous described during this sampling effort

1117 - using a stainless steel spoon sample placed in 750 ml, new nalgene containers.

Gulfco Marine

8/20/10

1130 - 12 bottle loaded & placed in three centrifuges

- samples spun @ ~3500 rpm for 15 min

\* photo extraction from nalgene post spin

\* photo pore water sampling materials

1) 750 ml plastic bottle

2) stainless steel spoon

3) 60 ml monoject sterile syringe

4) 0.45  $\mu$ m Filter column

1143 - 1358 - Porewater removed w/ syringe & stirred

After pore water extraction bottles were scoop clean w/ a stainless steel spoon & refilled w/ same site sediment

Bottles not rinsed between centrifuge runs

\* photo pre centrifuge EIWSED 01 PW

\* photo post centrifuge EIWSED 01 PW

1200 - 1300 - Continuous process until volume reached

\* Excess overlying water post centrifuge

dumped into next round of bottles for the same sample

\* photo of bottle cleaning

\* photo of clean bottle

- If syringe <sup>not</sup> type EIWSED 01 PW - Tip of syringe hit sediment, syringe disposed off.

1300 - 2nd bucket EIWSED 01 PW Homogenized



Gulfo Marine

8/20/10

- 1400 - EIWSED01PW - <sup>Porewater collected</sup> combined into one sample container & homogenized before being placed into sample containers
- combined container was a 20L cubic container
  - SAMPLE TIME EIWSED01PW = collected time

1419 - Break for lunch

1510 - Return from lunch

1510-1530 - Sampling apparatus (Mixer + spacers) washed w/ soap & water & rinsed w/ DI

1531 - EIWSED02PW homogenized

1531-1550 - EIWSED02PW loaded into 12 new bottles for centrifuge

1614-1749 Pore water removal from bottles w/ syringe & put in combined container thru filter.

- Excess sediment <sup>(EIWSED01PW)</sup> placed in separate bucket from EIWSED01 for placement back @ site tomorrow 8/21/10

Gulfo Marine

8/20/10

- Containers for EIWSED02PW handled the same way as EIWSED01PW between centrifuge runs - 1628 - 1710

1631 - EIWSED02PW - Syringe drew sediment into it. Attempted to be filtered & then when unsuccessful disposed of.

1633 - Mixer decon & EIWSED02PW bucket #2 Homogenized

- New filter installed every 60ml

1640 - Run #2 started

- EIWSED01 + 02
- Bottles post centrifuge cleaned into buckets for placement back @ site on 8/21/10

- 1714 - EIWSED03PW Bucket #1 homogenized w/ decon plate mixer

1719 - EIWSED03PW loaded into bottles for Run #1

Gulfo Marine

8/20/10

1737 - EIWSED03PW Run #1 started

1753 - EIWSED02PW transferred into  
sample containers (poured from cubiconainers)  
- EIWSED02PW sample time = collected time  
- Cubiconainer placed in trash after emptied  
into sample containers

1758 - EIWSED03PW - pore water removal  
started w/ syringe

1828 - Run #2 started

1846 - EIWSED03PW Bucket # 2  
Homogenized w/ decon. mixer

1931 - EIWSED03PW Run #3 started

2018 - EIWSED03PW - 3L Analysis  
3L - MSMSD  
- Pore water removal complete

2020 - EIWSED03 - Transferred from  
combined cubiconainer into sample  
analysis jars

Gulfo Marine

8/20/10

2026 - All pore water sample bagged &  
placed in cooler w/ ice

2030 - Sampling complete for day

2035 - Left site for day  
- Sampling to resume @ 0730 8/21/10

END OF DAY

MEL



Gulfco Marine

8/21/10

0700 - Left hotel for site

0720 - Arrive @ site

0720 - 0815 Prep boat for departure

- WEATHER: Sunny, hot + humid. High of 98 °F. Heat index of 110 °F. Chance of Rain 20 %.

PLAN FOR DAY: Collect + process two ICWW sites for pore water.

Personnel on site: EA: Michael Chinn

Besi: Neil Hawthorne

Scott Beauchamp

Brett Sutter

0830 - EIWSED01-03 post centrifuge sediment dump

0835 - Mob to EIWSED05 PW Sites

0840 SAMPLE TIME EIWSED05 PW

- water removed from top of grab

- 4 grabs taken

0840 - 0910 - EIWSED05 PW collection

0911 Sediment quality EIWSED05 PW

pH: 6.25 Temp: 29.8°C millivolts: 28.4

Gulfco Marine

8/21/10

0912: Mob to EIWSED04 PW

0920 - SAMPLE TIME EIWSED04 PW

0920 - 0946 - EIWSED04 PW collection

0950 - Sediment quality EIWSED04 PW

pH: 6.37 Temp: 29.5°C millivolts: 19.4

- 0948 WQ EIWSED05 PW

Total depth: 4 ft

Depth	3 ft	1 ft
Temp	28.27 °C	28.24 °C
Cond	43820 µS/cm	43810 µS/cm
Salinity	28.17 ppt	28.16 ppt
pH	7.95	7.94
DO	5.08 mg/L	4.74 mg/L
ORP	35.4	14.3

0953 - WQ EIWSED04 PW

Total depth: 3.8 ft

Depth	2.8 ft	1 ft
Temp	28.20 °C	28.25 °C
Cond	46520 µS/cm	46570 µS/cm
Salinity	28.18 ppt	28.18 ppt
DO	4.05 mg/L	4.14 mg/L
pH	7.94	7.94
ORP	1.4	-2.9

Gulfco Marine

8/21/10

1000 - In to shore for processing

1014 - Arrive @ dock

- EIWSED05PW placed in cooler w/ ice

1018 - EIWSED05PW - homogenized w/ decon plaster mixer.

1023 - EIWSED05PW - placed in 12 new pre cleaned sample bottles for centrifuging.

1039 - EIWSED05PW Run #1 started

1058 - EIWSED05PW pore water removal from bottles started

1109 - EIWSED05PW - cleaned centrifuge bottles between runs w/ metal spoon  
a photo of filtering into cub container

1129 - EIWSED05PW Run #2 started  
a photo of reloading bottles

- Left over pore water from previous runs dumped into next round of centrifuging.

Gulfco Marine

8/21/10

1145 - EIWSED05PW - Bucket #2 Homogenized  
a photo pore water extraction

1312 - EIWSED05PW collection complete  
- poured into sample jars  
- 4 jars sample  
- 4 jars duplicate  
a photo pouring into jars

1330 Break for lunch

1430 Return from lunch

1432 - 1435 - Decon mixer + spoons

1436 - EIWSED04PW Bucket #1 homogenized

1439 - EIWSED04PW - loaded into 12 new, clean sample bottles (plastic)

1452 - EIWSED04PW Run #1 started

1513 - Pore water EIWSED04PW extraction w/ syringe started.



Gulf of Mexico

9/21/10

1520 - Syringe that touched sediment disposed of.

1544 - EIWSED04PW Run #2 started

1552 - EIWSED04PW Bucket #2 homogenized

1642 - EIWSED04PW collection complete

1646 - EIWSED04PW composite transferred into sample jars

1703 - Left site for day

END OF DAY

MC

Gulf of Mexico

8/22/10

0700 - Left hotel for site

0720 - Arrive @ site

0730 - Prep boat for collection

WEATHER: Sunny, hot & humid. High of 99°F. Heat index of 115°F. Chance of rain 20%.

Personnel on site: Michael Chano  
Besi - Neil Hawthorne  
Brett Sutter  
Scott Benichamp

Plan for day: Collect one ICWLW site & process due to filter constraints until Monday (8/23/10).

MC EIWSED04PW 0500 dumped on slip where collected. (Post centrifuge sediment) - decided to do @ another time due to fishing activity.

0810 - Mob to EIWSED06PW

0845 - SAMPLE TIME EIWSED06PW



Gulfco Marine

9/22/10

0918 - Sediment measurements ELWSEDO6PW

Temp: 29.5°C pH: 6.77 millivolts: -1.3

0913 - WQ @ ELWSEDO6 PW

Total depth: 5.9 ft

Depth	4.9 ft	3 ft	1 ft
Temp	28.11°C	28.11°C	28.11°C
Cond	43570 $\mu$ S/cm	43570 $\mu$ S/cm	43570 $\mu$ S/cm
Salinity	27.99 ppt	28.00 ppt	27.99 ppt
pH	8.09	8.15	8.16
DO	4.87 $\mu$ L	4.73 $\mu$ L	4.52 $\mu$ L
ORP	47.7	33.1	30.4

0825 - 0917 ELWSEDO6PW Collection

0922 - Into shore

0932 - Arrive @ dock

0940 - ELWSEDO6PW Bucket #1 Homogenized

0942: ELWSEDO6PW loaded into 12 clean sample bottles (plastic) for centrifuging.

0959 - ELWSEDO6PW Run #1 started

Gulfco Marine

8/22/10

1020 - Sample ELWSEDO6PW pore water removal w/ syringe started

1025 - ELWSEDO6PW Run #1 bottle cleaning started (Scraped out w/ stainless steel knife & spoon)

- Excess pore water not siphoned out; poured into next round of centrifuging  
\* photo of cub container

1043 - Run #2 started

1058 - ELWSEDO6PW Bucket #2 Homogenized

1107 - Extra pore water pulled from bottle was less than 60ml (20ml) was not filtered into cub container until next run was done in centrifuge (20min) placed in glove to protect tip & set on table.

\* photo of syringe

\* photo of weighing of bottles prior to placement in centrifuge for balancing

Gulfo Marine

8/22/10

1151 - E1WSE006PW removal w/  
syringe complete

1154 - E1WSE006PW composite homogenized  
& poured into sample containers,  
amber glass jars for analysis

1215 - left site for day

END OF DAY

mic

Gulfo Marine

8/23/10

WEATHER: Sunny, hot, humid. High of  
100°F. Heat index of 110°F. Chance  
of Rain 20%.

PLAN FOR DAY: ReCollect reference  
sediment sites & one marsh site  
for pore water extraction

Personnel on site: EA - Michael Chanor  
- Kaitlen McGraw  
Boss - Neil Hawthorne  
- Brett Suther

0800 - Left hotel for site

0820 - Arrive @ site

0820 - 0900 - Prep for sampling

0900 - Mob to NAS07

0908 - SAMPLE TIME NAS07

0908-0912 - NAS07 collection & homogenization



Gulfo Marine

8/23/10

→ NAS07 collected into 5 gal bucket  
w/ 6" trowel & mixed w/ trowel before  
being placed in sample jars

0915 NAS07 Extra sediment dumped  
back @ site

0916 - Mob to NAS08

0917 - Sample time at NAS08

Vegetation removed from  
around site prior to collection

0917 - 0921

Sample collection and  
homogenization

Sample collected into new  
5 gallon bucket same as  
NAS07

0921 - NAS08 - extra sediment  
dumped back at site.

Gulfo Marine

8/23/10

0922 - mob to NAS09

0923 - sample time at NAS09  
veg. removed from around  
site prior to collection

0923 - 0927

Sample collection and  
homogenization

Sample collected into new 5  
gallon bucket same as NAS07  
and NAS08

Sample scooped into sample jars  
with clean, decont. spoon.  
New spoon used for each  
sample

0927 - NAS09 extra sediment  
dumped back at site

0928 - mob to EWSEDO1 - PW

0933+ arrive at ~~EWSEDO1~~<sup>km</sup> - PW  
EWSEDO1



Gulfco Marine

0933-0944 sample collection  
vegetation cleared prior  
to sample collection

8/23/10  
EWSEDO1-PW

sample collected w/ <sup>cleaned</sup> deconed  
shovel into new 5 gallon  
bucket

visible fiddler crabs  
removed from sample

top 6" of soil sampled

water depth just below 6"  
in sample hole

Photo of sample collection

Photo 0-6" on shovel

0944 back to house for  
processing.

0953 arrived back at house  
samples were placed in a  
cooler with ice upon arrival

Gulfco Marine

8/23/10

0955 samples scooped into  
new bottles with clean,  
decon-ed spoons

bottles are plastic

photo of sample scooping  
photo # 100-6058, 91

Run 1 started at 1013

Centrifuge around 3500 rpm  
run for 15 minutes

Extraction begins 1036

sample cloudy - centrifuge on  
for an additional 15 minutes

Extraction begins - test extraction  
due to filter constraints - no  
filters until Tuesday 8/23

1134 mob to EWSEDO3-PW

1137 - arrive at EWSEDO3-PW



1138<sup>1141</sup> Collected 2 centrifuge bottles  
of soil. homogenized in clean  
5 gallon bucket w/ clean  
decon-ed trowel.

2 photos one of sample  
location.  
one of sample transfer to jar

1141 add'l material dropped at  
site location

1142 mob to EWSED06-PW

1143 collect 2 centrifuge  
jars from EWSED06-PW

Vegetation removed from  
site before sample collection

decon procedures not followed  
as bucket and trowel  
will be disposed of post  
reconnaissance sampling

1145 sample homogenization w/  
trowel in 5 gallon bucket

Gulfo Marine

8/23/10

1145-1148 samples transferred to  
jar.

1148 remaining sample discarded  
at sample location

1149 mob to EWSED07-PW

1151 arrive at EWSED07-PW

1152-1153 sample collection of  
material for 2 centrifuge  
bottles

1153-1157 Sample homogenized in a  
5 gallon bucket w/ trowel  
and transferred to centrifuge  
bottles (2)

photo of sample location

1157 remaining sample disposed  
of at sample location

1158 - mob to EWSED04-PW



Gulfco Marine

8/23/10

1159 Sample collected at  
EWSED04-PW

photo of Sample collection  
at EWSED04-PW

1200 Sample homogenized and  
transferred to 2 centrifuge  
bottles.

1205 remaining sample dropped  
at sample loc

1207 mob to EWSED09-PW

1210 arrive at EWSED09-PW  
and collect sample for  
2 centrifuge jars

1211-1214 homogenize sample and  
scoop into sample jars

photo of sample loc  
EWSED09-PW

Gulfco<sup>km</sup> Gulfco Marine

8/23/10

1216 remaining sample disposed  
of at sample point

1215 mob to EWSED05-PW

1217 arrive at EWSED05-PW  
and collect sample  
photo of site

1218 homogenize sample from  
EWSED05-PW

1219 sample transferred to two  
centrifuge bottles

1221 ~~for~~ remaining sample  
disposed of onsite

1222 mob to lab for analysis

1231 EWSED04-PW  
EWSED05-PW

put in centrifuge for 30 minutes  
at ~3500 rpm



Gulfco Marine

8/23/10

1237 EWSED03-PW  
EWSED09-PW

put into centrifuge  
for 30 mins at  
~ 3500 rpm

1242 EWSED06-PW  
EWSED07-PW

put into centrifuge for  
30 mins at ~ 3500 rpm

1245 break for lunch

1255 return at 1430 after picking up Ke

1430 - no water in EWSED09-PW  
EWSED05-PW  
EWSED03-PW  
EWSED06-PW

water - some in  
EWSED04-PW  
EWSED07-PW

Gulfco Marine

8/23/10

EWSED04B-PW - ~20mL

got 16mL -  
hard to get rest  
EWSED04A looks like  
the same amount of water  
as EWSED04B-PW

re-centrifuging EWSED04A-PW  
for 30 minutes

EWSED07<sup>B</sup>~~A~~-PW - ~25mL

filter not usable after  
5mL

EWSED07<sup>A</sup>~~B~~-PW - ~30mL

very cloudy H<sub>2</sub>O samples

1450 re-centrifuging both EWSED07-PW  
and EWSED04-PW

1525 checked recovery on centrifuged  
samples

EWSED04B-PW -  
~40mL g  
recovery

1545 decision made to collect

Gulfo Marine

8/23/10

AVS Samples after Shipping  
coolers

1630 Filters not arriving until  
Wednesday. Decision made to  
complete AVS sampling  
Tuesday 8/24.

1645 left site for day.

End of day  
KEM

Gulfo Marine

KEM  
8/23/10  
8/24/10

0730 depart hotel

0800 arrive onsite - crew here is  
cutting tubing for ~~decon~~<sup>KEM</sup> AVS  
samples and is about to  
start decon of equipment for  
use today.

0802 decon to start - crew first  
washes tubes with soap and  
water, then rinsed with  
DI water and placed in  
clean, new ziploc bags.

WEATHER: Sunny hot humid. High  
of 100°F. Heat Index of 110°F.  
Thunderstorms last night.

PLAN FOR DAY: Collect AVS samples

Personnel on site: EA - Kaitlin McCormick

BESI - Neil Henthorne

Brett ~~Sutter~~<sup>KEM</sup> Sutter

Scott Beauchamp

0830 ATV loaded with sample supplies.



Gulfo Marine

08/24/10

0835 collected equipment blank by running DI water through tubing

separate crew members cleaned trowels and shovel with soap and water.

0845 resume loading supplies and field prep

0850 mob to EWSE004 and EWSE007

0855  
~~0857~~ arrive at EWSE004

0855 begin collecting sample

photos of sampling method  
Total of 4 photos.

1st attempt - placed capped 6" piece of plastic core liner on ground, used wooden board <sup>on</sup> over cap and hammered board to drive core liner. A ~~white~~ <sup>thin</sup> hole

Gulfo Marine

8/24/10  
24

made in cap to allow air to escape.

2nd attempt made with same method with new liner and cap.

Core removed by digging out soil around core and pulling out core, as shown in photos.  
digging done with washed, but not decon-ed trowel, since trowel didn't touch sample.

0903 sample collection complete at EWSE004

one member of crew to push up sample at house with extruder, cut remaining liner off to ensure no headspace and then cap and seal  
return to sample point.

0906 crew measured temp, pH, mV of soil.  
photo taken



Gulfco Marine

8/24/10

0910  
measurements: 30.8 °C temp  
6.65 pH

did not catch mv reading - it  
was taken.

0911 - measurement probes washed in soap and  
water.

0913 - mob to house

0915 - arrive at house for core processing

0917 used nitrile glove over  
end of extruder to condense  
sample.  
2 photos taken

rinsed outside of core liner with DI  
water. Wiped remaining mud off  
outside of liner.

0919 cut off portion of empty core  
with core cutter.  
2 photos taken

Gulfco Marine

8/24/10

removed extra liner and capped  
core with a new, clean cap.  
Core labelled with sample ID and  
duct taped caps to liner.

AVS sample stated to require no  
headspace.

sample labelled and given time of  
0855, when sample collection commenced.

0926 - depart house for EUSED07

0929 - arrive at EUSED07

0930 - sample collection begins.  
note: used keys at both this  
sample and last to puncture  
cap.  
2 photos taken  
Sample collected same as  
2nd attempt at EUSED04

2 add'l photo taken  
+ 1 photo of collected core



Gulfco Marine

8/24/10

0936 take Soil readings

pH 6.80  
Temp 31.3 °C  
orp 216.2 mV

0939 wash soil probes in soap and H<sub>2</sub>O

0942 mob to EWSED03

0943 arrive at EWSED03

0944 collected sample following same  
methods as previous location.  
one photo taken

Soil appears much drier at  
this location

decision made to record  
Temp only because of concern  
that probes may break.

Second photo taken.

0949 take Soil readings  
32.6 °C

Gulfco Marine

8/24/10

Sample at EWSED03 bulged cap  
out - thought to have no air  
in headspace.

0952 mob to EWSED06

0953 Sample collection begins at  
EWSED06 - using same  
method as previous samples.  
2 photos taken

0957 - clean trowel

0959 - Soil 176.1 mV orp  
readings 31.7 °C - Temp  
7.19 pH

1000 clean probes

1002 mob to EWSED02

1004 arrive at EWSED02

1005 sample collection begins.  
Same procedure as previous  
sites  
photo taken x2



Gulfo Marine

8/24/10

1012 soil readings taken

orp 10.2 mV

pH 6.43

Temp 31.4°C

1018 wash soil probes and trowel

1020 mob to EWSED01

1021 arrive at EWSED01

1023 begin sample collection at EWSED01

vegetation cleared before collection.

Same method as previous

Sample.

Photo taken

1024 sample readings taken

orp -18.0 mV

Temp 30.6°C

pH 6.85 pH

1026 soil probes washed

1030 mob to EWSED09

1031 arrive at EWSED09

only taking temp at this loc  
b/c of dry soil.

Gulfo Marine

8/24/10

1032 Sample collection begins -  
Same method as previous  
photo taken - x2.

1034 37.3°C temp Sample of  
6.98 pH Soil readings  
00.5 mV orp

1036 wash soil probes

1040 mob to EWSED08

1041 arrive at EWSED08

1042 begin sample collection  
photo taken

Same procedure as previous

Sample. Sample bagged but not  
2nd photo clipped in field.  
taken

1045 soil readings taken  
to 31.7°C

1050 10.6 orp (mV)  
6.95 pH

1051 wash probes in soap water

1052 mob to EWSED05



Gulco Marine

8/24/10

1053 arrive at EWSED05

1054 begin sample collection

Same method as previous  
sample., S

5 photos taken + 1 of final core

1054 Soil reading:

to orp 63.4 mV - orp

1058 6.23 pH

37.8 °C - Temp

probe broken - plastic guard  
only - actual probe intact

1100 probes washed

1103 mob to house for processing

1105 arrive at house.

1110 sample processing begins

cores extruded to eliminate head  
space, capped, taped, and  
labelled

extrusion done using same

Gulco Marine

8/24/10

method as previously done for  
EWSED04, same capping method  
used.  
photo taken

1st core done processing - EWSED05 at  
1116 - top and bottom of core  
labelled.

2nd core started - EWSED02 at  
1117, finished 1126  
photo taken. (#100-6097)

3rd core started - EWSED01 at 1127,  
finished at 1134  
photo taken (#100-6098)

4th core started - EWSED03 at 1135  
finished at 1141

5th core started at 1141 <sup>pm</sup> ~~1150~~  
EWSED09, finished at ~~1150~~

6th one started at 1150 <sup>pm</sup> ~~1155~~  
EWSED06, finished at 1155  
no need to extrude or  
cut this core, was not done



Gulfco Marine

8/24/10

1155 begin processing EIWSED03  
did not need to extrude or  
cut this sample

1159 finished processing EIWSED03

1200 begin processing EIWSED07  
did not need to extrude or  
cut this sample.

1205 finished processing EIWSED07

1210 Break for lunch

1330 return from lunch  
team to prepare sediment  
left from pore water  
extraction for return to  
the sample locations.

Centrifuge bottles opened and  
sediment placed in a  
separate 5 gallon bucket  
for each sample station.

1420 completed emptying  
centrifuge jars

Gulfco Marine

1420 loaded boat to return  
sediment to sample locations

1430 depart on boat for site  
EIWSED02-PW

1439 arrive at EIWSED02-PW  
Sediment emptied back at  
site

1441 mob to EIWSED03-PW

1442 arrive at EIWSED03-PW<sup>and</sup>  
begin emptying buckets

1444 mob to EIWSED01-PW

1445 place sediment at site

1446 mob to EIWSED04-PW and  
EIWSED05-PW

1448 arrive at EIWSED04-PW  
and EIWSED05-PW  
sediment placed back at  
sites.

1453 mob to EIWSED06-PW



Gulfeo Marine

8/24/10

1457 arrive at E/WSEDob-PW -  
and begin emptying sediment  
at site.

1501 mob back to house

1509 arrive back at house  
unload boat

1515 finish for the day.  
Plan to complete 3 PW  
Samples tomorrow

end of day  
KEM

Gulfeo Marine

8/25/10

0715 Depart Hotel

0735 Arrive at site - BESI not  
out yet

WEATHER: Sunny, hot, high of 93°F.

PLAN FOR DAY: Meet between 0730 and  
0800 for 0800 departure for first  
sample location. Plan to collect  
and process 3 pore water stations

Personnel onsite: EA - Kaitlin McCormick  
BESI - Neil Henthorne  
Brett Soutar  
Scott Beauchamp

0750 BESI personnel arrive and  
begin loading boat

0807 BESI prepares equipment blanks

Note from Neil - equipment blank  
for AVS not sent to lab - lab  
indicated they could only run the  
analysis on solids

Gulfco Marine

8/25/10

0810 Calibrated YSI - also still  
collecting equipment blanks

~~0828~~<sup>0830</sup> mob to E1WSEDO7-PW  
0830

0836 arrive at E1WSEDO7-PW

0837 begin collection of sediment  
1st grab - 5 gallon bucket  
rinsed with site water  
before filling bucket with  
sediment

Sediment Scooped from Ponar  
with Stainless Steel spoon  
that had been decont.

Ponar cleaned before use.  
Pump used to remove surface H<sub>2</sub>O

0844 Ponar grab #2  
Sediment Scooped as with  
first grab.

0850 Ponar grab #3  
2 photos taken

Gulfco Marine

8/25/10

0857 a barge passed over the  
sample point. waiting  
until 0905 to sample

0908 Grab #4 - sample collected  
Same as previous

0913 Grab #5 - sample collected  
Same as previous grab

0923 take water quality measurements  
Depth 7.7 ft

Bottom reading - 6.7  
mid - 3.8 ft

	Bottom	mid	Surface
Temp (C)	27.76	27.78	27.77
Cond (uS)	58.97	59.00	59.00
Sal (ppt)	37.13	37.14	37.14
pH	7.90	7.87	7.85
ORP	-182.7	-220.2	-198.7
DO (mg/L)	4.14	4.07	4.04

All buckets of sediment put on  
ice.



Gulfo Marine

8/25/10

0924 <sup>pm</sup>

~~0824~~ Soil readings

ORP -27.3

pH 6.70

Temp 29.1 °C

0930 rinse Ponar at site

0931 mob to house for processing.

0940 arrive at house and  
unload boat

0947 fill bottles and prep bottles  
for centrifuge to collect  
E1WSE07 pore water.

0951 sample homogenized - before  
filling bottles - tool de-coned  
before use

0954 rinsed homogenization equipment.

0956 begin filling sample bottles  
using de-coned spoon.  
Jars for centrifuge are

Gulfo Marine

8/25/10

clean and new

2 photos taken

1010 balance jars for centrifuge

1016 First centrifuge started -  
will run for 15 minutes at  
~3500 rpm

1019 2nd centrifuge started -  
will run for 15 minutes at  
~3500 rpm

1034 3rd centrifuge started -  
will run for 15 minutes at  
~3500 rpm

1043 first recovery of E1WSE007-A2  
collected → 1st syringe full only  
Run 1 - 60 mL + more  
Should be adequate recovery from  
same.  
used same syringe/filter method  
as previously



Gulfco Marine

8/25/10

1045 one crew member emptying and refilling centrifuge bottles with material while another crew member continues collection of pore water from bottles run.

photo taken of water collection

1107 - begin 2nd round of centrifuging after balancing bottles.

1112 - 1st centrifuge run of 2nd round

1128 - 2nd antr. fuge run of 2nd run

1136 - 3rd centrifuge run of 2nd round

Continue to process water as samples are available after centrifuging

Gulfco Marine

8/25/10

1152 #7 started (1st one of round 3)

problems with centrifuge -  
rebalance needed 1203

1217 #7 re-started after balancing

1232 - equipment blank for marsh  
Site taken - EWSE08-PW-EB

1238 - process run #7

1240 - finished processing EWSE08-PW-EB

1249 - Pore water transferred from 5 gallon container to new 1 liter amber bottles for laboratory analysis

1253 Break for lunch

1252 km resume work - back  
1312 ATIV



Gulfco Marine

8/26/10

13 km

1314 mob. to EWSEDOB-PW

13 km

1318 arrive at EWSEDOB-PW

1319 begin sample collection  
vegetation cleared from  
sample area before  
collection.

Soil collected using a  
decontaminated stainless  
steel shovel and transferred  
into a new, clean 5  
gallon bucket

photo taken x3

Samples collected to depth of  
shovel - ~1 foot

1325 - Soil readings taken

ORP 140.2 mV

Temp 82.2 °C

pH 5.41

1328 - Finish sample collection

1330 - mob to house for processing.

Gulfco Marine

8/25/10

1334 return to house and unload  
equipment

1336 rinse off shovel into 5  
gallon bucket  
Unload truck/ATV

5 gallon buckets put on ice.

1339 homogenized first bucket (1 of 3)  
of material from EWSEDOB-PW  
with cleaned, de-contaminated  
equipment.

Sample very clayey - hard to  
homogenize. material not  
well mixed, but pore water  
will be mixed before bottling  
for lab.

1343 begin transferring soil into  
centrifuge bottles. bottles  
are clean and new.

1348 begin balancing 1st set of  
centrifuge jars.



Gulfc0 Marine

8/25/10

1353 1st set of 1st run put  
in centrifuge for ~30 minutes  
at 3500 rpm

~~13~~

1402 2nd set of 1st run put in  
centrifuge for ~30 minutes at  
3500 rpm

1409 3rd set of 1st run put in  
centrifuge for ~30 minutes  
at 3500 rpm

1426 begin collecting pore water -  
using same methods as  
previous pore water  
collection.

1436 1st set of 2nd run  
put in centrifuge for  
~30 minutes at 3500 rpm

switched method of extraction.  
Pore water cloudy. Water  
composed from multiple

Gulfc0 Marine

8/25/10

sets into another clean centrifuge  
bottle by decanting water into  
jar. The pore water will  
be centrifuged again and then  
brought into the syringe and  
filtered. Composite jar of PW kept  
on ice.

1511 2nd set of <sup>2nd</sup> 3rd<sup>run</sup> run started -  
to run for ~30 minutes at  
3500 rpm

1528 3rd set of 2nd run started  
to run for ~30 minutes at  
3500 rpm

~~1542~~ <sup>4th</sup> 3rd<sup>run</sup> set of <sup>2nd</sup> 3rd<sup>run</sup> run started.  
1545 will run for ~30 minutes at  
~3500 rpm

1549 1st set of 3rd run started  
will run for ~30 minutes at  
~3500 rpm

centrifuge stopped -  
rebalanced jars and  
restarted at 1602



Gulfco Marine

8/25/10

1609 2nd set of 3rd run  
started at ~3500 rpm  
for 30 minutes

2 photos taken

1648 3rd set of 3rd run  
started at ~3500 rpm  
for 30 minutes

Photo of pore water bottles

1730 - centrifuged pore water  
composites before  
filtering  
run for ~15 minutes  
at 3500 rpm

1750 begin filtering pore water  
and placing in 5 gallon  
container.

1823 Sample transferred to jars  
and placed on ice

1825 done for day.

end of  
day JEM

Gulfco Marine

8/25/10  
2:10  
PM

WEATHER: hot, sunny, high forecast of 96°F

PLANS FOR DAY: COLLECT and process  
two marsh stations for pore water

0730 depart hotel

0745 arrive onsite. Crew to <sup>room</sup> is  
cleaning and de-contaminating  
equipment for use today, and  
load ATV

Personnel onsite: EA- Kaitlin McCormick  
BES1- Neil Henthorne  
Brett Soutar  
Scott Beauchamp

0800 mob to site EWSEDO2-PW

0813 arrive on site, begin collection  
of sediment. Using same method  
of collection used at ~~EWSEDO2~~ EWSEDO8<sup>2</sup>  
photos taken x 4

Standing water at site has  
receded noticeably at the site.  
Since we visited the area on Tuesday  
8/24



Gulfco Marine

8/26/10

0821 - Soil readings taken at EWSE02-PW  
pH 6.89  
Temp 27.5 °F °C  
orp -273.8 mV

0821 - Completed soil collection -  
3 five gallon buckets worth.  
All soil collected from areas  
at location not previously  
disturbed by earlier sample  
collection.

0826 mob to house for processing

0830 arrive at house - and put  
buckets of soil on ice

0831 prep for processing

0836 decon of tools used to  
collect sample EWSE02-PW

0836 begin filling centrifuge bottles -  
bucket not homogenized before  
material used to fill bottles

0849 1st set of 1st run started  
(#1) will run 30 mins @ ~3500 rpm

photo taken of placement of soil into jars.

Gulfco Marine

8/26/10

photo of jars prepped for centrifuge

0900 2nd set of 1st run started (#2)  
will run for ~30 minutes at 3500 rpm

0903 3rd set of 1st run started (#3)  
will run for ~30 mins at  
3500 rpm.

Centrifuge needed to be restarted -  
restart began at 0906

Note: not previously written, but there  
has been a health and safety  
meeting each morning before starting  
work.

0924 1st set of 2nd run started (#4)  
will run for ~30 minutes at  
3500 rpm.

0925 about 650 mL recovery from  
#1 - sufficient water to assume  
adequate recovery at this station.

Centrifuge jars to be emptied  
and re-used for this sample  
only



Gulfco Marine

8/26/10

- 0933 ~600 mL recovery from #2  
 0946 ~500 mL recovery from #3  
 0952 2nd bucket of sample opened -  
 not homogenized before use.  
 1000 2nd set of run 2 (#5) started  
 in centrifuge for 30 mins at  
 ~3500 rpm  
 1004 2 photos taken  
 ~500 mL recovery from #4  
 1022 3rd set of run 2 (#6) started  
 in centrifuge for 30 mins at ~3500 rpm  
 1034 ~500 mL of recovery from #5  
 1058 ~500 mL (estimate) of recovery  
 from #6  
 1100 Pore water not in centrifuge  
 jars as composites for PW  
 run, extracted w/ syringe.  
 This water would not fit in  
 the four bottles for the  
 water run  
 1100 Pore water centrifuge  
 run started. To run 15 mins  
 at ~3500 rpm.

Gulfco Marine

8/26/10

- 1103 - extracted water on ice between  
 runs.  
 1120 begin filtering pore water and  
 putting into clean 5 gallon  
 jug.  
 1142 transferred pore water to jars  
 for analytical laboratory  
 2 photos taken - one of  
 filtering and one of transfer  
 1153 mob to EWSED01-PW  
 1157 arrive at EWSED01-PW  
 took photo of site. Site  
 noticeably drier than it was  
 on Tuesday  
 1158 sample collection begins. Sample  
 collected in same manner as  
 EWSED08-PW. Collected top 6"  
 of soil. vegetation cleared  
 before sample collection.  
 3 photos taken.  
 Soil collected from undisturbed  
 areas at sample location.  
 1 additional photo taken



Gulfco Marine

8/26/10

- 1207 took soil readings  
ORP 88.4 mV  
Temp 29.3 °C  
pH 6.59
- 1208 mob back to house to process soil (EWS001-PW)
- 1213 arrive at house
- 1214 put soil buckets on ice  
3 buckets were collected  
prep bottles and spoons for filling of centrifuge bottles - decontaminated/cleaned spoons
- 1219 begin filling centrifuge bottles  
did not homogenize bucket before using soil to fill bottles.
- 1239 balanced first two sets of filled centrifuge bottles.
- 1243 Started first set of 1st run (#1)  
at ~3500 rpm for 30 minutes
- 1246 Started 2nd set of 1st run (#2)  
at ~3500 rpm for 30 minutes
- 1311 Started 3rd set of 1st run (#3)  
at ~3500 rpm for 30 minutes
- 1318 Started 1st set of 2nd run (#4)  
at ~3500 rpm for 30 minutes

Pore water methods

Gulfco Marine

8/26/10

- 1318 begin transferring pore water to water centrifuge bottle  
run #3 ~290 mL of pore water from run #1 (set #1)  
~300 mL of pore water from #2  
~~run #4 - not started yet~~ Started at ~3500 rpm for 30 minutes
- 1328 break for lunch
- 1343 resume working
- 1343 Centrifuge for run #4 had stopped - restarted and run for 20 minutes at 3500 rpm
- 1358 Run 4 has ~325 mL of pore water
- 1408 Run 3 has ~250 mL of pore water
- 1415 run #5 started. ~3500 rpm for 30 minutes
- 1423 run #6 started, will run at ~3500 rpm for 30 minutes
- 1442 run #7 started. ~3500 rpm for 30 minutes
- 1447 run 5 has ~250 mL of Pore water
- 1449 run #8 started at 3500 rpm for 30 minutes



Gulfc Marine

8/26/10

1459 ~225 mL of recovery from #6.

1511 #9 started (3rd set, 3rd run) on centrifuge to run for 30 minutes at ~3500 rpm - centrifuge unbalanced - rebalanced and restarted at 1536 - still unbalanced

1523 #10 started (1st set, 4th run) on centrifuge to run for 30 minutes at ~3500 rpm

1523 ~250 mL recovered for from #8

1524 #10 off balance - rebalanced and restarted at 1532

1527 ~250 mL recovered from #7

1547 - #9 restarted in new centrifuge

Gulfc Marine

8/26/10

1548 - First centrifuge #9 was in run on empty - no problem with run on empty

1600 - crew packing coolers while centrifuges run

1617 - #11 (4th run, 2nd set) start - will run for 30 minutes at 3500 rpm

Run #<sup>xm</sup> ~~10~~ had ~250 mL of recovery

1620 #<sup>9</sup> ~~12~~ had ~250 mL of recovery.

1643 #12 (4th run, 3rd set) started - will run for 30 minutes at 3500 rpm.

1650 #11 had ~250 mL of recovery

1704 #13 (5th run, 1st set) started - will run for 30 minutes at 3500 rpm

1726 ~200 mL of recovery from #2



Gulfo Marine

8/26/10

Neil and Scott went to collect recon samples of EWSED04-PW and EWSED07-PW because moisture is being lost from the soil in the dry heat - two centrifuge jars of soil will be collected from each location and run to see if pore water collection is reasonably feasible at those locations still.

1737 recon samples from EWSED04-PW and EWSED07-PW run

1740 ~175 mL of pore water from #13

1743 pore water composites run for 15 mins at ~3500 rpm

1744 pore water not fitting into the 4 centrifuge bottles of pore water was extracted with a syringe and filtered into the new, clean 5 gallon container for pore water at EWSED01-PW.

Gulfo Marine

8/26/10

1800 begin filtering composite pore water samples using a syringe and filter - same as procedure for EWSED02-PW

1820 - 40 mL recovery from 2 jars at EWSED04-PW  
45 mL recovery from 2 jars at EWSED07-PW

should be doable in ~15 to 16 sets (5+ runs) for

1825 absolute minimum needed by lab - 1.1L

1825<sup>km</sup> EWSED01-PW transferred to bottles for analytical laboratory.

1829<sup>km</sup> pore water samples put on ice until shipping.

1830 Finish for day

1835 depart site for hotel

end of day  
REM



# Gulfo Marine

8/27/10

WEATHER: hot, sunny, high in mid-90s  
Plan for day: Collect and process one sample from marsh

0733 depart hotel for site

0748 arrive at site -

crew completing decan  
of equipment to be used

0755 take equipment blank

0758 mob to EWSED04-PW

0803 arrive at EWSED-PW

0804 cleared vegetation from  
sample area

0805 begin sample collection

2 photos taken

collection method same as  
previous sites

4 buckets of soil collected

Top 6" of soil collected

0813 Soil readings taken

ORP 103.0 mV

Temp 27.9 °C

pH 7.05

Note: Soil was collected in new,  
clean 5 gallon buckets.

# Gulfo Marine

8/27/10

0815 mob to house for processing

0818 arrive at house

buckets loaded into coolers  
and iced

0820 Centrifuge bottles (new and clean)  
filled with soil using cleaned  
stainless steel spoon.  
bucket not homogenized before  
filling bottles

0820 - Shovel from sample collection  
cleaned

0830 Centrifuge bottles for 1st set  
balanced - crew continues filling  
bottles while ~~centrifuging~~ centrifuging  
takes place. During previous  
samples bottles were reused for  
that sample, only crew  
have sufficient bottles remaining  
to not reuse bottles for  
this sample - each centrifuge  
run to have new bottles

0834 1st set started (#1) in centrifuge  
to run 30 minutes at ~3500 rpm



## Gulfo Marine

8/27/10

Personnel onsite on 8/27/10:

EA - Kathleen McCormick

BES1 - Neil Henthorne

Scott Beauchamp

Brett Soutar

Also - no health and safety meeting held before starting work.

0839 2nd set started (#2) in centrifuge to run for 30 mins at ~3500 rpm

0845 3rd set started (#3) in centrifuge to run for 30 minutes at ~3500 rpm

0852 Health and safety briefing

0914 - #2 had <sup>run</sup> ~50 ~70 mL of porewater  
#1 had ~70 mL of porewater

0922 - 4th set started (#4) in centrifuge to run for 30 minutes at ~3500 rpm

## Gulfo Marine

8/27/10

0925 - 5th set started (#5) in centrifuge to run for 30 mins at 3500 rpm

0927 - #3 had ~150 mL of porewater

0934 - 6th set started (#6) in centrifuge to run for 30 minutes at 3500 rpm. Not balanced properly - re balanced and restarted at ~~1053~~ <sup>1053</sup> after retrying original set - without success - a new set replaced it. Those jars will be re done in another machine.

1001 - #5 had about ~40 mL of recovery

1002 - 7th set started (#7) in centrifuge to run for 30 mins at 3500 rpm

1007 - ~80 mL recovered to #4

1010 - 8th set started (#8) in centrifuge to run for 30 minutes at 3500 rpm



Gulfeo Marine

8/27/10

1026 #9 (set 9) started in  
centrifuge for 30 mins at  
3500 rpm

about 100 mL recovery from  
#6 - same procedures used  
today that were used on  
8/26/10

1036 #10 (set 10) started in  
centrifuge for 30 minutes at  
3500 rpm

~100 mL recovery from #7

1053 #11 started in centrifuge for  
30 minutes at 3500 rpm

~70 mL of recovery from #8

1057 #12 started for 30 minutes  
at 3500 rpm

~100 mL of recovery from #9

Gulfeo Marine

8/27/10

1112 #13 started for 30 minutes  
at ~3500 rpm

~100 mL of recovery from #10

1131 #14 started for 30 minutes at  
~3500 rpm

#12 had ~80-100 mL of  
recovery

1133  
1143 <sup>12M</sup> #14 off balance - rebalanced  
and restarted at 1142

1136 #15 started for 30 minutes at  
~3500 rpm

1149 #13 had ~50-60 mL of  
recovery

1149 #14 off balance again.  
restarted in a different  
machine at 1152 for 30  
minutes at 3500 rpm.

Gulfco Marine

8/27/10

1217 ~50-60 mL of recovery from #14

1234 ~80 mL of recovery from #15  
porewater bottles balanced and  
placed in centrifuge  
photo taken - #100-6127

1237 run for 15 minutes at  
~3500 rpm - EWSEDO7-PW

1238 Break for lunch

1412 return from lunch - resume  
sampling

1414 begin syringe/filter process -  
same as done yesterday, 8/26/10

1420 complete filtering  
transfer water from 5 gallon  
container to analytical jars.

1422 pack coolers and  
prep for shipment

Gulfco Marine

8/27/10

1430 finished for the day - plan  
to resume tomorrow at 0800  
to collect and process  
EWSEDO7-PW.

1433 Depart site for hotel.

end of day  
km



Gulfo Marine

8/28/10

Weather: hot, sunny, high ~96  
clear skies

Plan for today: collect and  
process EWSED07-PW

Personnel <sup>BESI</sup> onsite: Neil Kennerne  
EA Kaitlin McCormick

To be joined this morning  
by William Quast from BESI

0730 depart Hotel

0740 arrive onsite

personnel have already  
loaded ~~TV~~ with  
equipment for mob

0803 mob to EWSED07-PW

0807 arrive at EWSED07-PW

0808 begin sample collection -  
Same method as previous  
pore water samples -  
3 photos taken  
4 buckets collected

Gulfo Marine

8/28/10

0815 Soil readings taken

Temp 20.9°C

ORP 257.7 mV

pH 6.96

0817 mob to house

0820 arrive at house for  
processing of soil.

Note: Neil received notification at  
1900 last night (8/27/10) that  
two pore water sample  
bottles broke in transit on  
way to lab. Add'l water to be  
collected from that site on Monday  
8/30/10

0822 Clean/decon of sampling  
equipment. Shovel and  
boots hosed off - but just  
rinsed into adjacent channel  
rather than a bucket as  
was done previously.

0830 put buckets on ice except  
the one to be used for  
processing.



Gulfco Marine

8/28/10

0836 prep centrifuge bottles for filling and processing.

0846 begin filling jars  
bucket not homogenized before filling jars, same procedure as previous samples  
William Quest arrived

0912 Centrifuge Set 1 started (#1) at ~3500 rpm for 30 mins.

0917 Set 2 started - #2 at ~3500 rpm for 30 mins

0923 Set 3 (#3) started at 3500 rpm for 30 minutes

0950 #1 had ~130 mL of recovery  
#2 had ~110 mL of recovery

0957 #4 (set 4) started at ~3500 rpm for 30 minutes

1000 #5 (set 5) started at ~3500 rpm for 30 minutes

Gulfco Marine

8/28/10

1006 - ~200 mL recovery from #3

1009 - set 6 (#6) started at ~3500 rpm for ~30 minutes

1037 - set 7 (#7) started at ~3500 rpm for 30 minutes  
set 8 (#8) started at ~3500 rpm for 30 minutes

1039 photo taken of pore water removal from jars

~160 mL of recovery from #4  
~200 mL of recovery from #5

1054 set 9 (#9) started at ~3500 rpm for 30 minutes

1056 #6 had ~160 mL of pore water

1113 set 10 (#10) started at ~3500 rpm for 30 minutes

1115 ~200 mL of recovery from #8



Gulfco Marine

8/28/10

1115 #10 off balance - to be  
rebalanced and restarted

1116 #11 started (Set 11) at ~3500 rpm  
for 30 minutes

Note: as of 1117 - no health and  
Safety briefing today.

1118 ~150 mL of recovery from  
run #7

( ~~1136~~ KM

1137 Set 12 (#12) started at ~3500 rpm  
for 30 minutes

#10 to be redone with new  
bottles - those being replaced  
will be re-weighed and used  
for another set. All the  
balancing problems today  
and yesterday were on the  
same centrifuge

1139 #10 off balance again.

Gulfco Marine

8/28/10

1140 ~100 mL of recovered pore water  
from #9

1155 ~160 mL recovery from #11

1157 #10 started in new  
centrifuge for ~~30~~ 30 mins at  
~3500 rpm

1217 #13 started in centr. fuge  
#10 was originally in with  
new bottles and after  
BESI checked and rebalanced  
machine. One of the  
centrifuge cups found to be  
2 grams lighter than rest.

1221 #14 Set in centrifuge at  
~3500 rpm for 30 minutes

#12 had ~190 mL of recovery  
of pore water

1230 #10 had ~150 mL of pore  
water



Gulfo Marine

8/28/10

1231 #15 started will run for  
~30 minutes at ~3500rpm

1248 ~200 mL recovered pore water  
from #13

1302 ~190 mL of pore water  
from #14

1311 ~150 mL of pore water  
from #15

1312 balanced pore water centrifuge  
bottles for run

1315 started pore water run -  
for 30 minutes at ~3500rpm

1320 break for lunch

1445 return from lunch

1452 begin prep for filtering  
2 photos taken

1455 begin filtering using a  
syringe and filter - same

Gulfo Marine

8/28/10

method as used for previous  
sample (EWS04-PW)

2 photos taken

7<sup>PM</sup>

1519 transfer sample to jars  
for analytical laboratory  
jars placed on ice will  
be shipped on Monday (7 day  
holding time)

1530 finish for day - demo  
until Monday, 8/30/10

Plan for Monday - collect  
surface water sample and  
recollect pore water sample  
that broke in transit.  
Sample collection should be complete  
after Monday.

end of day  
KEM



Gulfco Marine

8/30/10

weather: hot, sunny, humid, high  
in mid-90s

plan for day: Collect the  
surface water sample from  
the marsh and recollect  
the pore water sample that  
broke (EWS007-PW).

arrive onsite at 0850, BESI  
crew prepping for collection  
of sample at EWS007-PW

Personnel onsite: EA-Kaitlin McCormick  
BESI: Neil Henthorne  
Scott Beauchamp  
Brett Soutar

0916 - mob to surface water site  
water level station levels  
at the station have risen -  
due to a high tide.  
EWSW-01

0923 arrive at surface water  
Station 1.

Gulfco Marine

8/30/10

0924 BESI to set tubing for  
surface water collection -  
will come back later after  
turbidity settles to collect  
the water sample.

0926 complete recon of other  
SW and PW sites.  
EWSW-01 is now  
sampleable because of  
high

EWS006-PW also  
now has water and is  
collectable

returned to house

0932 arrive at house -  
checked map of SW  
stations - one add'l  
SW station may also  
be sampleable.

0937 mob to EWSW-04



## Gulfco Marine

8/30/10

0939 arrive at EWSW-04 -  
photo taken - BES1 to  
set out tubing similar to  
EWSW-04.

Tubing set out into  
surface water area and  
attached to post in water.  
area allowed to settle  
before we return to  
collect SW sample.  
2nd photo taken.

0941 mob to EWSW-03

0942 EWSW-03 is dry - no  
surface water for  
collection.

return to house

0944 arrive at house

0945 prep for mob to intercoastal  
PW site

0950 Health and Safety  
briefing

0952 depart house for  
EIWSE07-PW by boat

## Gulfco Marine

8/30/10

1001 Consulting GPS for exact  
sample location - Station  
marker submerged by high  
tide.

1005 Station marked with weight and  
buoy.

1006 prep for sample collection.

1008 Collect first grab at EIWSE07-PW  
sample collected using clean  
Van Veen - extra water drained  
off sediment surface with  
pump. Sample scooped  
using clean stainless steel  
spoon and placed in new  
5 gallon bucket.

Equipment blank done at  
house while I was with  
the portion of team that  
was setting tubing for  
surface water samples.

1015 2nd grab collected at EIWSE07-PW  
grab not used - too far from  
sample point.



Gulfo Marine

8/30/10

repositioned boat.

1018 grab 3 collected at EIWSEDO7-PW  
Same procedure as 1st grab.

1023 grab 4 collected, same procedure  
as previous grab. - nothing  
collected but water in van been -  
repositioned boat

1025 grab 4 collected, same procedure  
as grab 1 and 3

1033 grab 5 collected, same  
procedure as previous grab  
full 5 gallon bucket put on ice.

1040 grab 6 collected, same  
procedure as previous grab  
4 photos taken

1047 grab 7 collected, same procedure  
as grab 6

1057. grab 8 collected - no sediment  
only water. boat repositioned

1054 grab 9 collected, same procedure  
as grab 6 and 7

Gulfo Marine

8/30/10

1056 marker buoy retrieved  
prepare to take WQ readings

1102 Soil readings taken in sediment  
pH 6.37  
Temp 30.7 °C  
ORP 113.5 mV

1107 water quality - EIWSEDO7-PW  
depth 7.9'  
mid - 3.5'

	Bottom	mid
Temp	29.57 °C	29.67 °C
Cond.	59.36 $\mu$ S/cm	58.49 $\mu$ S/cm
Salinity	36.00 ppt	36.00 ppt
pH	<del>7.47</del> 6.59	6.52
ORP	-196.3	-199.1
DO	7.71 mg/L	8.06 mg/L
T km		

	Surface
Temp	1cm 29.67 °C 29.74 °C
Cond	59.35 $\mu$ S/cm
Salinity	35.95 ppt
pH	6.52
ORP	-204.3
DO	8.01 mg/L



Gulfco Marine

8/30/10

1117 rinse van reen in site water to remove sediment.

scrubbed with brush and alconox over water at site (not into a bucket)

1120 mob back to house for processing.

1130 arrive back at house -  
BESI crew unloading boat  
2 buckets of sediment were collected at E1WSEDO7-PW

one man of BESI crew to fill centrifuge bottles, while remaining two members to collect surface water samples.  
prep for SW collection

1145 collect equipment blank for surface water samples

1158 BESI preps to homogenize 1st bucket of sediment from E1WSEDO7-PW

Gulfco Marine

8/30/10

1200 1st bucket of E1WSEDO7-PW homogenized using cleaned tools

photo taken

tool rinsed into 5 gallon waste bucket

1203 Surface water crew mobilized - first just Brett - Neil to follow after calling lab.

1208 arrive at site ESK<sup>km</sup> EWSU-01 took photo of setup.

1210 begin pumping water into 5 gallon new sample containers for toxicity testing. 15 gallons to be collected.

2 photos taken

1223 begin filling 2nd 5 gallon container

1238 begin filling 3rd 5 gallon container



Gulfo Marine

8/30/10

- 1242 WQ parameters taken by filling a cup with site water and then taken from the sample in cup
- Temp 35.37°C
- Salinity 43.20 ppt
- pH 5.86
- Cond 77.38  $\mu\text{S}/\text{cm}$
- DO 3.78 mg/L
- ORP -262.5 mV
- 1252 begin filling jars for other analyses - including MS, MSD, and field duplicate
- 1305 mob to house to get one more sample bottle for EWSW-01
- 1310 arrive at house
- 1313 EWSW-01 put on ice in cooler.
- 1325 mob back to EWSW-01 with replacement bottle.
- 1328 arrive at EWSW-01

Gulfo Marine

8/30/10

- 1329 Collect sample for replacement jar
- 1330 mob to EWSW-04
- 1331 arrive at EWSW-04 and set up sampling apparatus - photo taken
- 1333 begin sample collection - same method as used at EWSW-01 photo taken
- 1335 cup filled for WQ parameters - same as EWSW-01
- 1336 water quality readings:
- Temp 35.91°C
- Cond. 75.53  $\mu\text{S}/\text{cm}$
- Salinity 41.69 ppt
- 1344 begin filling 2nd 5 gallon container.
- 1348 read remaining WQ parameters
- DO 5.00 mg/L
- pH 7.19
- ORP -280.6 mV



Gulfco Marine

8/30/10

1353 begin filling 3rd 5 gallon container

1403 begin filling jar for analytical laboratory

1404 Finish sample collection mob to house

1408 arrive at house - transfer samples to cooler

Begin centrifuging - BEI  
Crew member filled and balanced jars - not run until I was back at site for oversight

1411 - Set 1 (#1) of EIWSED07-PW to run for 15 minutes at ~3500 rpm.

1413 Set 3 (#3) of EIWSED07-PW to run for 15 minutes at ~3500 rpm

1413 Set 2 (#2) of EIWSED07-PW to run for 15 minutes at ~3500 rpm

Gulfco Marine

8/30/10

1432 - #2 had ~530 mL of recovery from EIWSED07-PW

1438 Set 4 (#4) started to run for 15 minutes at ~3500 rpm run off balance - stopped

1441 #1 had ~520 mL of recovery

1443 #3 had ~530 mL of recovery

1444 Set 5 (#5) started to run for 15 minutes at ~3500 rpm

~~1446~~<sup>km</sup> Set 6 (#6) started to run for 15 minutes at ~3500 rpm

1510 ~~run~~<sup>km</sup> set 4 (#4) re-started in a new machine - to run for 15 minutes at ~3500 rpm

1511 #6 had ~580 mL of recovery

1514 #5 had ~500 mL of recovery



Gulfco Marine

8/30/10

1515 Set 7 (#7) started - will run for 15 minutes at ~3500rpm

1345 begin filtering - pore water composites and filtering done same as yesterday ~~km~~ (8/29/10) for Saturday (8/28/10) for EWSEDO7-PW. Samples today (EWSEDO7-PW) did not need the pore water composites to be centrifuged.

1553 ~900 mL pore water recovered from ~~#8~~ ~~#7~~ ~~km~~ ~~km~~ ~~km~~ ~~#4~~

1557 ~580 mL of pore water recovered from #7.

1615 Completed filtering

1622 begin pouring porewater into jars for analytical laboratory

1630 BEST to pack and ship samples to the lab - samples to be shipped are those collected Saturday (8/28)

Gulfco Marine

8/30/10

and today one BEST crew member departed with the surface water samples earlier - only the 5 gallon containers - to drive them to the lab for toxicity testing.

Plan for tomorrow: Collect sample EWSEDO6-PW. This is the last remaining sample to be collected after EWSEDO6-PW is collected, BEST will begin demobilization.

End of sample collection and processing at 1635, shipping process has begun with packing of coolers

Oversight finished at 1636.

End of day  
KEM



8/31/10

# Gulfco Marine

0730 depart hotel

0745 arrive onsite - BES1

Crew making <sup>km</sup> prepping  
for field work

Weather: hot, humid, high of 93

Plan for day - collect pore water  
sample EWSEDO6-PW

0805 collect equipment blank -  
placed on ice in cooler after collected

Personnel onsite: EA - Kaitlin McCormick  
BES1 - Neil Henthorne  
Scott Beauchamp

0820 calibrated YSI and  
Soil meters

0833 mob to EWSEDO6-PW

0836 arrive at EWSEDO6-PW

0837 begin sample collection -  
site has standing water -  
excess water drained from  
sample before placing in

# Gulfco Marine

8/31/10

new 5 gallon bucket. Sample  
collected using cleaned stainless  
steel shovel. Top 6" of soil  
collected. - 2 photos with cellphone  
camera. Forgot regular camera

0839 Site readings - water quality

pH 7.17

Temp 27.84 °C

Cond 51.66 <sup>km</sup> ~~cm~~ <sup>µS</sup>/cm

Salinity 31.93 ppt

DO 3.80 mg/L

ORP -54.2 mV

0843 Site readings - soil

Temp 29.1 °C

pH 6.4

ORP 30.8

0851 Complete Sample Collection -  
rinse shovel in site water to  
remove excess soil.

0852 mob to house

0854 arrive at house. - buckets  
placed on ice until used -  
3 5 gallon buckets of soil  
collected.



Gulfc0 Marine

8/31/10

0902 prep (label) centrifuge jars.

0906 begin filling jars - any water settling on surface of bucket also put in jar - not much water settled on surface. Soil is very moist. Bucket not homogenized before filling centrifuge bottles/jars.

0924 run 1, set 1 - (#1) started for 30 minutes at ~3500 rpm.

0934 run 1, set 2 (#2) started for 30 minutes at ~3500 rpm.

0949 run 1, set 3 (#3) started for 30 minutes at ~3500 rpm.

1003 ~550 mL recovery from #1

1007 <sup>run</sup> run 2, set 1 (#4) started for 30 minutes at ~3500 rpm.

Gulfc0 Marine

8/31/10

pore water from each set being transferred to the composite pore water jars

1017 run 2, set 2 (#5) started for 30 minutes at ~3500 rpm

1020 ~500 mL of recovery from #2

2nd bucket of soil not homogenized before using.

3rd bucket of soil not homogenized before using. Bucket 2 not fully emptied before starting bucket 3.

1037 ~250 mL of recovery from #3

1040 run 2, set 3 (#6) started for 30 minutes at ~3500 rpm centrifuge off balance



Gulfco Marine

8/31/10

- 1046 run 3, set 1 (#7) started for 30 minutes at  $\sim 3500$  rpm
- 1049  $\sim 500$  mL recovery from #4
- 1050 #6 restarted - off balance again.
- 1101 <sup>set</sup> ~~run~~ #6 restarted in a different centr. fuge, for 30 mins at  $\sim 3500$  rpm
- 1102  $\sim 550$  mL of recovery from #5
- 1128  $\sim 575$  mL of recovery from #7
- 1131 begin prepping jars for analytical lab - jars labelled
- 1143  $\sim 200$  mL recovered from #6 that would fit in composite jars. Remaining to be filtered and syringed out of original asphinge bottles

Gulfco Marine

8/31/10

- 1146 begin filtering pore water not being centr. fugged
- start porewater set in centr. fuge for 15 minutes at ~~45~~ km  $\sim 3500$  rpm
- 1153 total recovery  $\sim 435$  mL from #6
- 1207 begin filtering composite samples - same as previous PW samples - porewater pulled into 60 mL syringe and then pushed through a 0.45 micron filter and into a 5 gallon, new plastic container
- 1229 complete filtering, transfer sample to bottles for analytical lab.
- 1233 completed filling of sample bottles for analytical lab



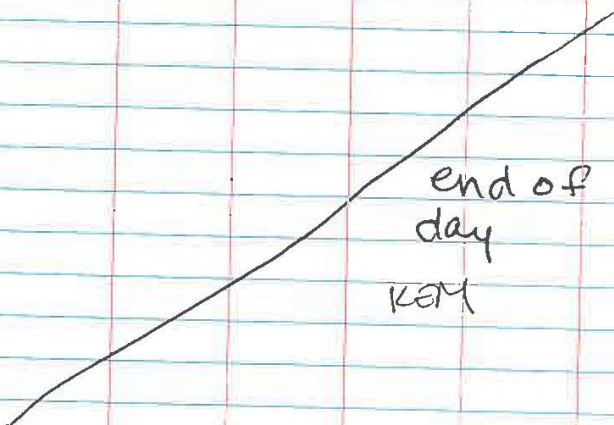
8/31/10 Golfo Marine

bottles for lab put in individual  
ziploc bags, new, and placed  
on ice in cooler.

1235 - no further field efforts  
of sample collection.  
BES1 to pack and ship  
samples and demob from  
site.

oversight finished

1237 Depart site.



end of  
day  
KAM